



**instruction book**

*Cedar Rapids Division | Collins Radio Company, Cedar Rapids, Iowa*

# **75S - 3 and 75S - 3A Receivers**





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**instruction book**

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**75S - 3 and 75S - 3A**  
**Receivers**

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### 1.1 Unpacking.

Lift the receiver out of the carton and packing material. Examine for visible damage. If the receiver has been damaged in shipment, save the box and packing material, and notify the transportation company. Complete and mail the equipment registration card. Check tubes and crystals for proper seating in sockets. Check tuning controls and switches for freedom of action. Check that the special Mu-Metal shields are in place on tube V11 and coil L10 (see figure 4-1). Check the equipment included with the receiver against table 1-1.

### 1.2 Cabling.

1.2.1 EXTERNAL CONNECTIONS. Figure 1-1 shows the location of jacks for external connections to 75S-3 and 75S-3A receivers. The power cable plugs into socket J13. The ANT jack is a nominal 50-ohm antenna input. The 4  $\Omega$  AUDIO jack is for connection of a speaker.

### CAUTION

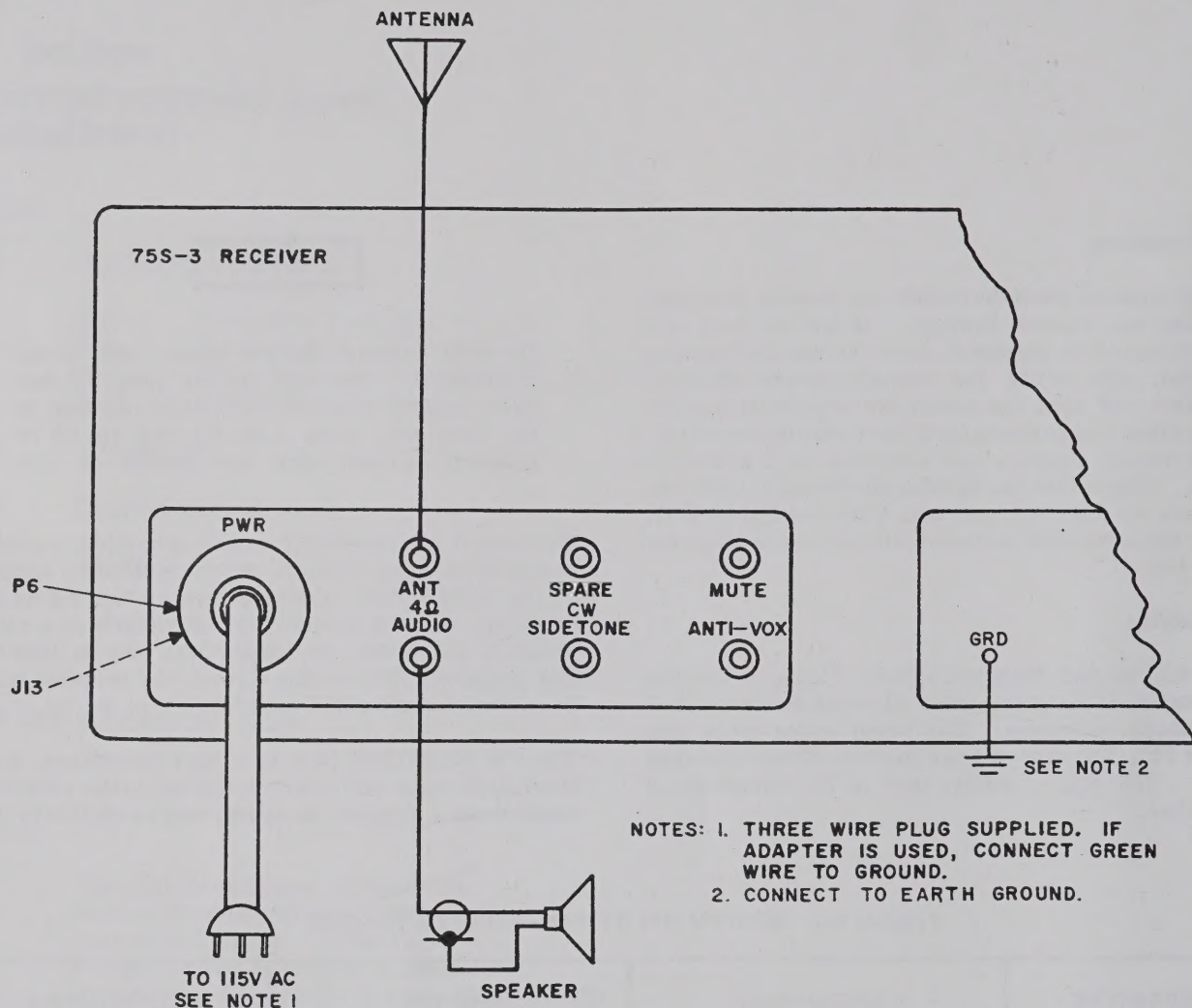
DO NOT connect the a-c power cord to the 115-volt a-c line until power plug P6 has been plugged into J13. To avoid damage to the receiver, make sure the key on P6 is properly aligned with the keyway on J13.

To connect the receiver for mute operation, a means of supplying a ground while receiving must be applied to the MUTE jack. Opening this circuit mutes the receiver. A set of normally closed contacts on a relay which is keyed with the transmitter may be used for this purpose. To use this circuit, the receiver must be operated in the STBY position.

The CW SIDETONE jack is a high-impedance, low-level audio input (0.2 volt rms, typical) to the receiver. Audio from a sidetone oscillator may be applied to this

TABLE 1-1. EQUIPMENT FURNISHED WITH 75S-3/3A

QUANTITY	DESCRIPTION	FUNCTION	PART NUMBER
2	Phono-type connectors	External connections	361-0062-00
1	Fuse, 2-ampere	Spare	264-4070-00
1	Power cord	A-c power	544-3121-00
1	Power plug adapter	A-c power	368-0138-00
1	Instruction book	75S-3/3A instructions	523-0148-00
1	Logbook	Station logging	523-0755-820
1	Cable marker card	Cable identification	280-2946-00
1	No. 4 Bristo wrench	Accessory tool	024-2900-00
1	No. 6 Bristo wrench	Accessory tool	024-9730-00
1	No. 8 Bristo wrench	Accessory tool	024-0019-00
1	No. 10 Bristo wrench	Accessory tool	024-9710-00



NOTES: 1. THREE WIRE PLUG SUPPLIED. IF ADAPTER IS USED, CONNECT GREEN WIRE TO GROUND.  
2. CONNECT TO EARTH GROUND.

Figure 1-1. External Connections

jack to provide a cw monitoring circuit through the receiver audio system.

The ANTI-VOX jack is a 500-ohm audio output from the receiver. At normal speaker volume levels, 5 to 10 volts rms is provided at this output. This voltage is normally applied to anti-vox circuits in an associated transmitter.

The PHONES jack on the front panel is connected through a resistive network to a 500-ohm tap on the output transformer. Therefore, best results will be obtained if headphones used are 500 ohms or higher impedance. The speaker is silenced when headphones are plugged in.

1.2.2 CABLING WITH 32S-3 TRANSMITTER. Figure 1-2 shows a complete station interconnection for a 75S-3 or 75S-3A Receiver, 32S-3 Transmitter, and

312B-4 Station Control. The RG-58C/U cables indicated are slightly larger in diameter and two inches shorter than the audio and control cables. If the 312B-4 is not used, connect a 4-ohm speaker, such as the 312B-3, to 4  $\Omega$  AUDIO jack on receiver. Connect ANTI-VOX jack on receiver directly to ANTI-VOX jack on transmitter. Omit PHONE PATCH and PTT connections.

To connect the 75S-3 or 75S-3A and the 32S-3 for transceiver operation, use the patch cables furnished with the transmitter, and connect as follows:

- Connect the 32S-3 and 75S-3/3A as shown in figure 1-2.
- Remove P1 from XMTR XTAL OSC jack J7 (under 32S-3 top cover), and plug it into 32S-3 RCVR XTAL OSC jack J6. Remove the 100-ohm dummy load plug from the 75S XTAL OSC OUTPUT jack, and plug it into 32S-3 XMTR XTAL OSC jack J7.



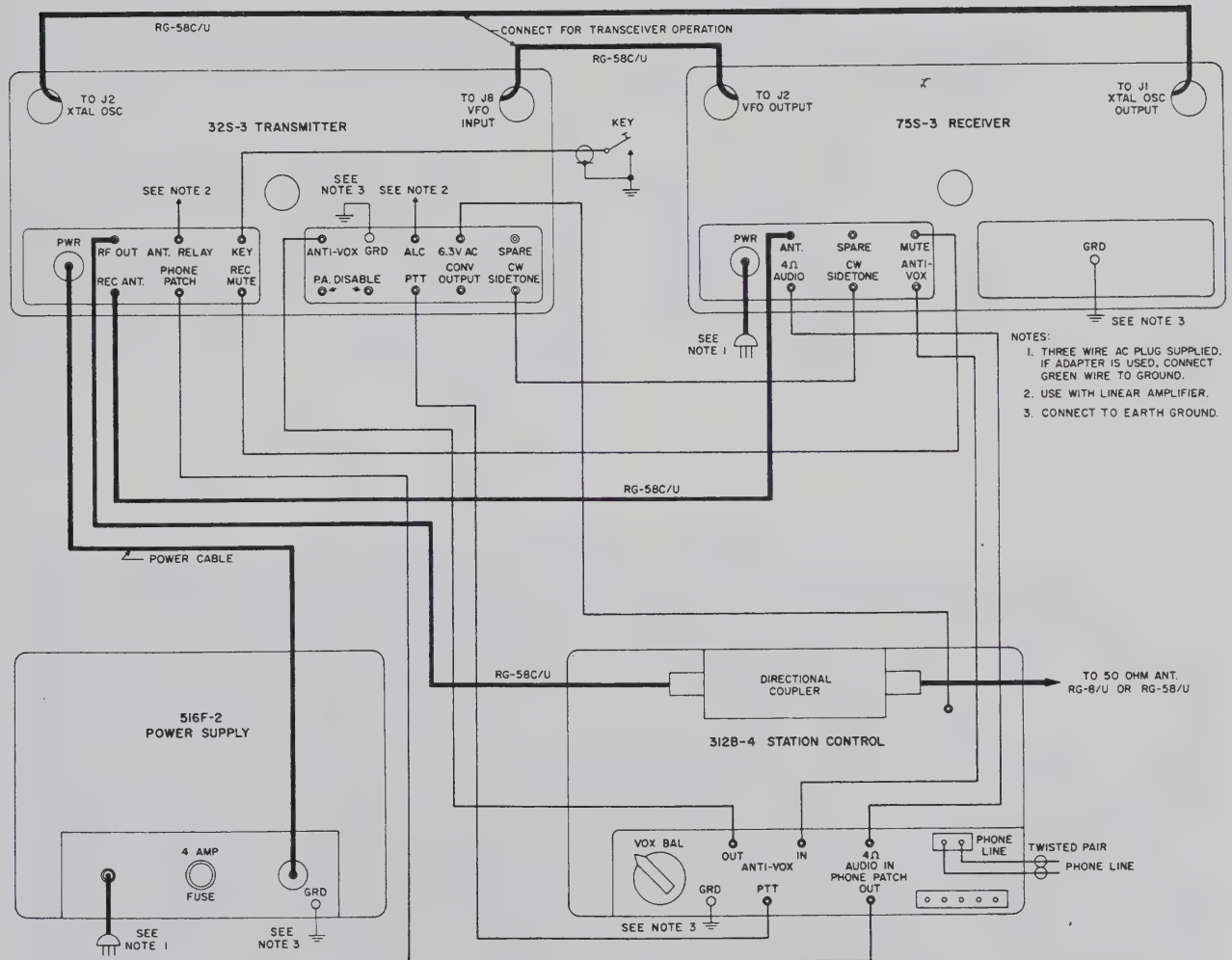


Figure 1-2. Station Interconnections

## SECTION 1

### Installation

**1.2.3 CABLING WITH KWM-2/2A TRANSCEIVER.**  
The 75S-3/3A may be used with a KWM-2/2A to provide separate transmit and receive frequencies. Connect the patch cables as follows:

- a. Using an RG-58C/U patch cable, connect REC ANT jack on KWM-2/2A to ANT jack on 75S-3/3A.
- b. Connect the 500  $\Omega$  jack on the KWM-2/2A to the ANTI-VOX jack on the 75S-3/3A. If a 312B-4 or 312B-5 is used, connect the KWM-2/2A 500 $\Omega$  jack to ANTI-VOX IN and the 75S-3/3A ANTI-VOX jack to ANTI-VOX OUT on the 312B-4/5.
- c. Connect the REC MUTE jack J20 on the KWM-2/2A to the MUTE jack on the 75S-3/3A.

The station speaker may be plugged into either the 4  $\Omega$  jack on the KWM-2/2A or the 4  $\Omega$  AUDIO jack on the 75S-3/3A. For normal mute operation, set the 75S-3/3A function switch to STBY. Receiver output from the KWM-2/2A is turned off by setting AF GAIN to zero. For transmit and receive operation on the same frequency, reduce the 75S-3/3A AF GAIN to zero, and operate the KWM-2/2A in a normal manner.

### 1.2.4 CABLING WITH OTHER TRANSMITTERS.

- a. To provide receiver muting when using 75S-3/3A with KWS-1, connect a cable from pins 5,6 on J102 (receiver disable) in the transmitter to MUTE jack on the receiver. Connect a cable from receiver ANTI-VOX jack to pin 7 on J102 (500-ohm audio) in the KWS-1. Connect cable shield to ground.
- b. To use the 75S-3/3A with the 32V-3, connect a cable from the receiver MUTE jack to receiver disabling pins 24 and 25 on the transmitter.
- c. To use the 75S-3/3A with other makes of transmitters, connect muting, cw sidetone, and anti-vox provisions in the receiver as applicable. The requirements for use are outlined in paragraph 1.2.1.

### 1.3 Initial Checks.

Lift the top cover, and make sure the dummy load (see figure 4-1) is plugged into the XTAL OSC OUTPUT jack unless the receiver is connected for transceiver operation. Recheck the interconnections to make sure the patch cables are plugged into the appropriate jacks. Be sure that RG-58C/U cables, rather than the audio and control cables, have been used for all r-f applications. Check to ensure the special Mu-Metal shields are in place on tube V11 and coil L10.



# section 2

## operation

### 2.1 Calibration.

- After making external connections, set controls as shown in figure 2-1.
- Set BAND switch (11) to desired frequency range. If receiver is 75S-3A, set crystal board selector (10) so desired set of bands appears in window.
- Set dial to 0, 100, or 200 with tuning knob (3).
- Adjust PRESELECTOR (2) for maximum signal or noise output.
- Tune back and forth near 0, 100, or 200 until calibrate signal is at zero beat.
- Adjust zero set knob (4) until dial is calibrated.

### 2.2 Single-Sideband Tuning.

- Set controls as shown in figure 2-1, except set function switch (1) to OPR, and the BFO knob fully counterclockwise until a click is heard.
- Set EMISSION switch (12) to desired sideband.
- Adjust PRESELECTOR (2) for maximum signal or noise output.
- Tune in signal and adjust AF GAIN (9) for desired audio output level.

When listening to strong signals, a reduction in background noise under no-modulation conditions may be

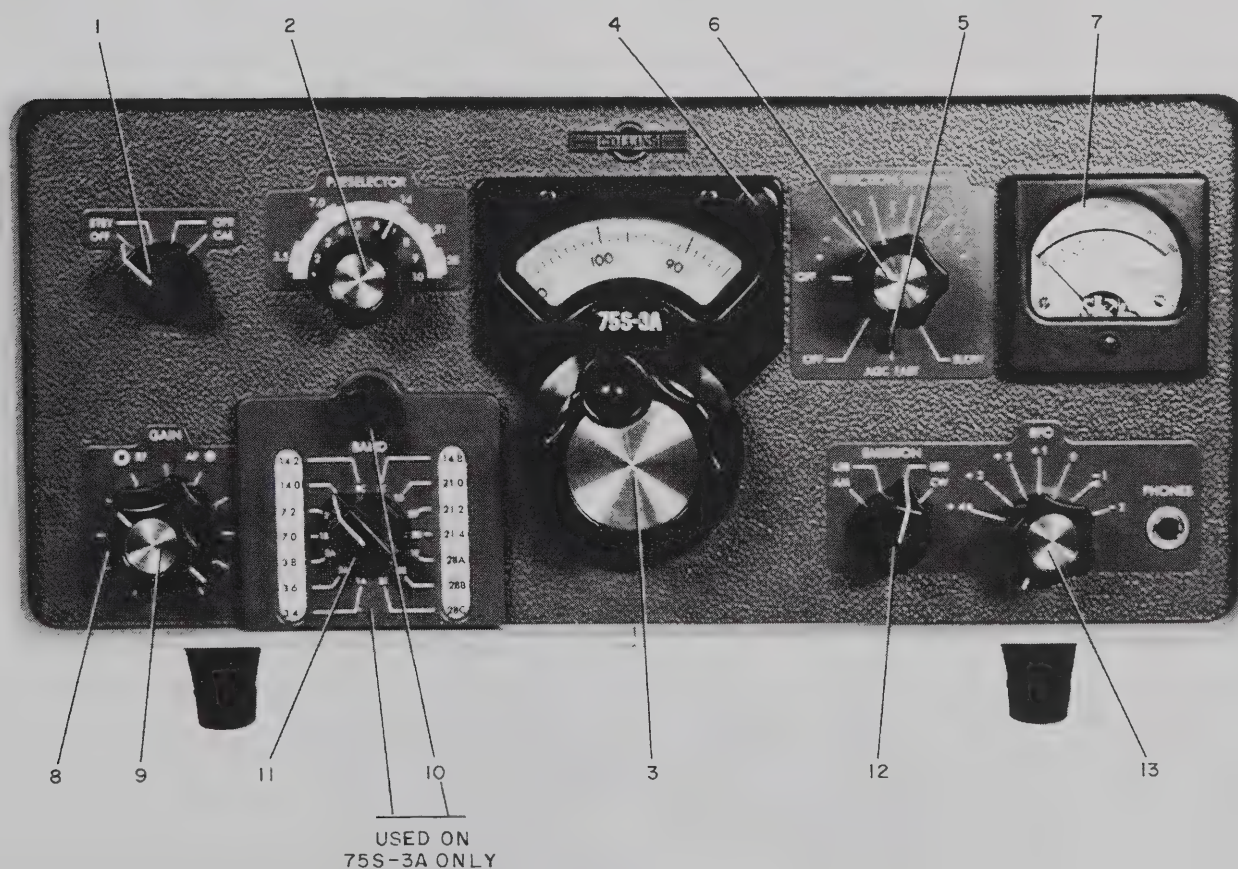


Figure 2-1. Operating Controls

## SECTION 2

### Operation

obtained by rotating RF GAIN control (8) counterclockwise, away from the maximum position. As this is done, S-meter (7) static reading will shift up scale. At proper gain control setting, meter will kick about one or two S-units on peaks. For example, if the weakest of the desired signals is peaking at S-9, set gain control so that static meter reading is S-7 to S-8. This retains accurate meter readings.

To read frequency, add the dial setting to the BAND switch setting. For example, if the BAND switch is set to 3.8 and the dial is set to 5, the frequency is 3.805 mc. If the BAND switch is set to 3.8 and the dial to 170, the frequency is 3.970 mc.

#### 2.3 CW Tuning.

- Set controls as outlined in paragraph 2.2 except set EMISSION switch to CW.
- Rotate the BFO knob (13) clockwise to energize the tunable bfo. Set to either +1 or -1.
- Adjust BFO knob to yield the most pleasing beat note with the desired signal centered in the filter pass band.
- Read approximate frequency as follows: When BFO knob is set to the plus side of zero, add kilocycle reading from bfo scale to dial reading. Subtract bfo reading for minus settings of the knob. If a precision reading is desired, set the BFO knob, and recalibrate the main tuning dial using the crystal calibrator. When the main dial is calibrated in this manner, further adjustment of the BFO knob or switching to the crystal-controlled BFO requires recalibration of the dial.

Either fast or slow AGC (5) may be used, or it may be turned off. If AGC is turned off, decrease RF GAIN control setting to prevent receiver overloading. Adjust AF GAIN control to provide desired audio level. In general, it is best to set r-f gain at a point just below that which causes signal to overload receiver. This provides optimum sensitivity.

Tuning may be facilitated by switching first to USB to tune in the desired signal and then switching to CW to reduce interference. The beat note will be the same in either position. The wider pass band provided in USB is also useful for net operation.

#### 2.4 AM Tuning.

- Set controls as outlined in paragraph 2.2.
- Set EMISSION switch to AM.
- Set AGC switch to FAST.
- Tune in signal, and adjust AF GAIN for desired audio output level.

If desired, SSB methods may be used for AM reception. Set EMISSION switch to either USB or LSB position; use tuning procedure for a single-sideband signal. Once the desired signal is tuned in, switching to the opposite sideband may yield a more readable signal. This method of reception is useful under conditions of severe interference or extreme fading.

#### 2.5 RTTY Tuning.

This type of operation requires an external RTTY converter and printer. Tune receiver as follows:

- Set controls for SSB reception as outlined in paragraph 2.2 with EMISSION switch in USB position.
- Turn on tunable bfo by rotating BFO knob (13) clockwise.
- Set the pointer on the BFO tuning knob at the dot near -1 on the calibrated scale.
- Tune the receiver for maximum S-meter reading on the desired RTTY signal.
- Fine adjustment of the BFO tuning knob then will produce 2125 cps and 2975 cps mark and space signals at the receiver audio output. To reverse the mark and space signals, reset the BFO tuning knob to the dot near +4 on the calibrated scale.

#### 2.6 Rejection Tuning.

An interfering heterodyne or cw signal may be reduced in level or eliminated by operation of the REJECTION TUNING knob (6). The off position for this control is at the end of extreme counterclockwise rotation. The on-off switch is provided with a positive stop rather than a detent. Do not force the knob. Clockwise rotation of the knob from the off position moves the rejection notch across the receiver pass band. It is recommended that the operator familiarize himself with the operation of this control by tuning the notch across the signal from the crystal calibrator.

When the receiver is initially placed in operation, it may be necessary to touch up the adjustment of R77. Refer to paragraph 4.5.8.

#### 2.7 Use of S-Meter.

The S-meter is intended primarily to indicate relative rather than absolute signal strength. A nominal meter reading of S-9 is obtained with an input signal of 100 microvolts. The threshold of agc operation is set at the factory to a nominal value of 1.5 microvolts. Due to normal tolerances in receiver operation, agc threshold varies slightly from band to band causing correspondingly slight changes in the number of db represented by each S-unit. The db scale is calibrated with 1 microvolt as a reference; therefore, an S-9 signal of 100 microvolts represents a 40-db increase over the reference signal level. Since agc is not applied to very weak signals, S-zero is arbitrarily established at 10 db on the scale. Typical meter readings, therefore, can represent from 3.3 to slightly over 4 db per S-unit. A figure of 4 db can be taken as an average.

#### 2.8 Transceiver Operation with 32S-3 Transmitter.

- Make sure patch cables are connected as outlined in paragraph 1.2.2.
- Set FREQ CONTROL (1) on 32S-3 to REC VFO position.
- Set OFF-STBY-OPR-CAL switch on 75S-3/3A to STBY position.
- Set both BAND selectors to the same desired band and both EMISSION switches to the same position (either USB, LSB or CW).
- Tune both receiver and transmitter as in normal operation. Both transmit and receive functions operate from the receiver vfo; the transmitter vfo is not used



in transceiver operation. Switching the transmitter FREQ CONTROL (1) back to TRANS VFO position will allow separate operation of the two units within the same 200-kc band.

## NOTE

In CW transceiver operation, the 75S variable bfo will have to be used to obtain the desired beat note if it is desired to transmit zero beat with another station.

**CAUTION**

When operating in transceiver service, do not operate the transmitter while the receiver is tuned outside band limits; the transmitted signal will be out of the band. Do not attempt operation with receiver and transmitter set on different 200-kc bands, even when operating in TRANS VFO position. With patch cables connected for transceiver operation, the receiver h-f crystal oscillator controls injection frequency to the transmitter second mixer.

If operation on different 200-kc bands is desired (that is, receive on one 200-kc band and transmit on another), remove the transceiver patch cables and operate the units as in normal independent operation.

If transmitted frequency is changed by any great amount, be sure to redip the PA plate current and check the loading. This will be most important on the 80- and 40-meter bands.

Some operating experience will indicate the amount of frequency excursion possible without readjustment.

Do not attempt operation in transceiver service with any other receiver not having the same frequency mixing scheme.

f. To restore both units to normal operation, remove the two patch cables connecting oscillator signals, replace P1 in J7 on the transmitter slug rack (under top cover), and replace the 100-ohm load plug in the receiver XTAL OSC OUTPUT jack.

## 2.9 Operation Outside Amateur Bands.

Additional 10-meter band coverage, or coverage outside the amateur bands may be obtained by plugging an appropriate crystal into the crystal mounting board. Two extra sockets are provided in the mounting board for this purpose. The total 3.4- to 30.0-megacycle coverage available is divided into five segments, designated A, B, C, D, and E. The frequency range of each of these segments is listed in the total coverage column of table 2-1. The letter portions of the crystal socket locations shown in figure 2-2 indicate which sockets may be used for crystals to cover a 200-kc band within a specific total coverage segment. For example, crystals for extended 10-meter coverage must be plugged into sockets marked E.

The proper crystal for coverage of a specific 200-kc band may be selected as follows:

a. If the lower edge of the desired band is 11.8 mc or less, the required crystal frequency is equal to the

TABLE 2-1. CRYSTAL FREQUENCIES AND OPERATING BANDS

BAND-SWITCH POSITION	FREQUENCY BAND	CRYSTAL SUPPLIED	CRYSTAL SOCKET CONNECTED	TOTAL COVERAGE
1A - 3.4	3.4 - 3.6 mc	6.555 mc	1A	A 3.4 - 5.0 mc
2A - 3.6	3.6 - 3.8 mc	6.755 mc	2A	
3A - 3.8	3.8 - 4.0 mc	6.955 mc	3A	
1B - 7.0	7.0 - 7.2 mc	10.155 mc	1B	B 6.5 - 9.5 mc
2B - 7.2	7.2 - 7.4 mc	10.355 mc	2B	
1C - 14.0	14.0 - 14.2 mc	8.5775 mc	1C	C 9.5 - 15.0 mc
2C - 14.2	14.2 - 14.4 mc	8.6775 mc	2C	
3C - 14.8	14.8 - 15.0 mc	8.9775 mc	3C	
1D - 21.0	21.0 - 21.2 mc	12.0775 mc	1D	D 15.0 - 22.0 mc
2D - 21.2	21.2 - 21.4 mc	12.1775 mc	2D	
3D - 21.4	21.4 - 21.6 mc	12.2775 mc	3D	
1E - 28A	28.5 - 28.7 mc	15.8275 mc	2E	E 22.0 - 30.0 mc
2E - 28B	As selected	Not supplied	2E	
3E - 28C	As selected	Not supplied	3E	



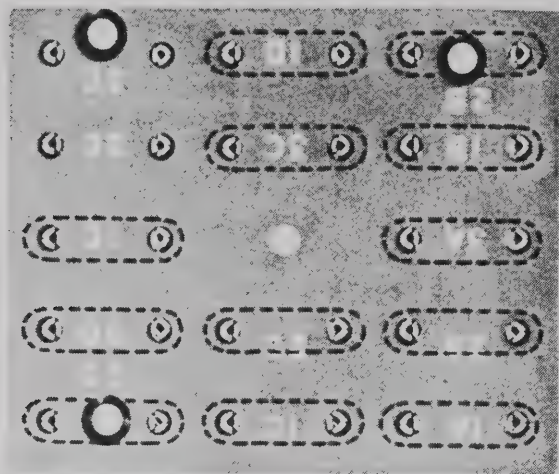


Figure 2-2. Crystal Socket Locations

lower edge of the desired band plus 3.155 mc. For example, if the desired band is 4.0 to 4.2 mc, the required crystal frequency is 7.155 mc.

b. If the lower edge of the desired band is 12.0 mc or higher, the required crystal frequency is equal to half the sum of the desired lower band edge and 3.155 mc. For example, if the desired band is 14.4 or 14.6 mc, the required crystal frequency is 8.7775 mc.

Extra crystals available are listed in section 6, Parts List.

Approximate settings for the PRESELECTION are shown in figure 2-3. For example, if coverage from 10.0 to 10.2 mc is desired, plug the appropriate crystal into a socket marked C, turn the BAND switch to that position, and set the PRESELECTION to approximately 3.2 on the logging scale. Peak the PRESELECTION tuning as in normal operation. The ANT, RF, and OSC trimmer capacitors (those marked C in the example above) may also be peaked if optimum performance is desired at frequencies outside the amateur bands. On some bands it is possible to peak the PRESELECTION tuning at an image frequency or at a different order of output frequency from the crystal oscillator; however, there is only one correct setting for coverage within a given 200-kc band.

The above information also applies to the 75S-3A except that two crystal mounting boards are provided in this receiver. The amateur-band board is located under the chassis. To obtain access, refer to paragraph 4.1. When crystal board selector (10) is switched to extended coverage position, the above-chassis board is switched into the circuit. The crystal socket locations are the same for both boards. Space is provided in the window adjacent to the BAND switch to mark in-band information. A pencil may be used to allow erasure if changes are made.

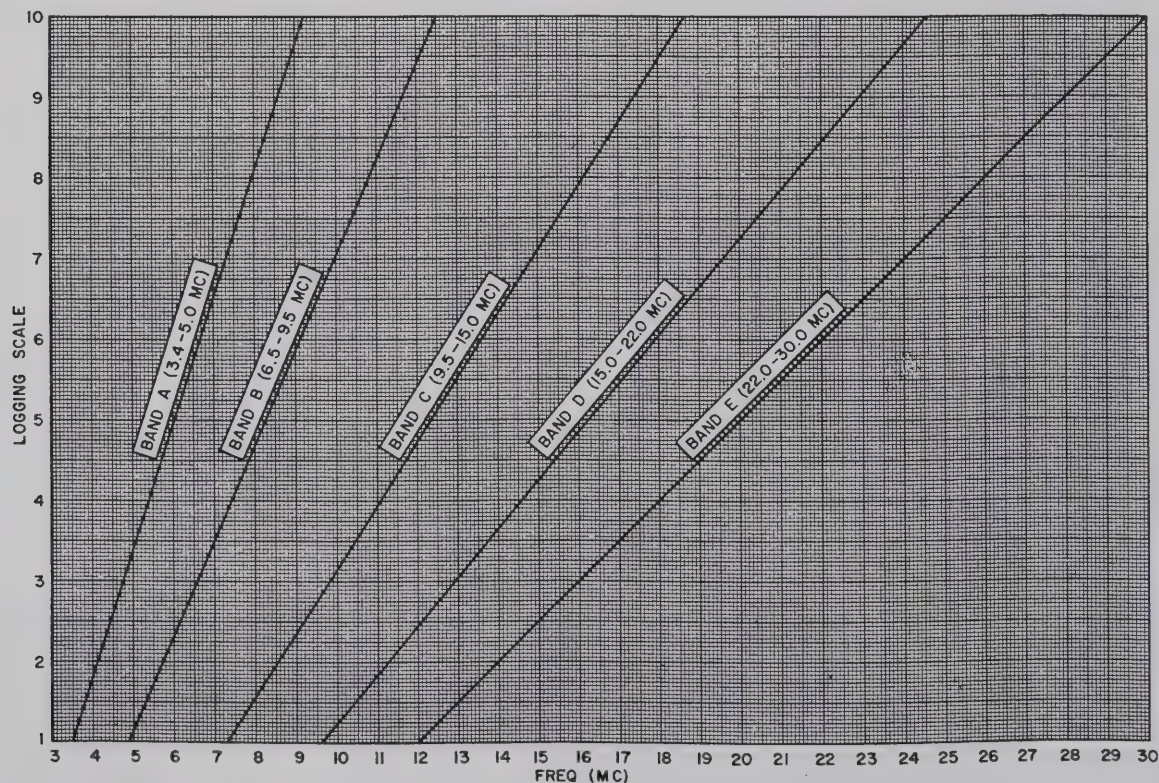


Figure 2-3. Preselector Calibration Curves



## principles of operation

### 3.1 Block Diagram.

Figure 3-1 is a block diagram for 75S-3 and 75S-3A Receivers. Double conversion is used, with injection voltage for the first conversion provided by a crystal-controlled oscillator. A band-pass i-f, 200 kilocycles wide, is used to couple the first and second mixers. Injection voltage for the second mixer is furnished by a vfo with a tuning range of 200 kc. The 455-kc output frequency of the second mixer is coupled through the i-f system to separate AM and SSB detectors. Injection voltage for the product detector is provided by either a crystal-controlled bfo or a tunable bfo. The 75S-3A is identical to the 75S-3 except that it is equipped with an extra h-f crystal mounting board on the chassis, a crystal board selector switch on the front panel, and associated components. Figure 7-1 is a schematic diagram for both receivers, with circuit differences noted.

### 3.2 R-F and Mixer Circuits.

The r-f amplifier grid, high-frequency mixer grid, and crystal oscillator plate circuits are resonated by slug-tuned coils. The slugs are mechanically ganged and linked to the PRESELECTOR tuning knob. The required tuning ranges of these circuits are obtained by switching appropriate values of fixed capacitance in parallel with the coils. The total 3.4- to 30-mc tuning range of the receiver is divided into five segments for band-switching purposes, as noted in table 2-1. The tuned circuit LC ratio is thereby varied within appropriate limits for each of the five segments.

Signals within the particular 200-kc band selected are amplified by V2, the r-f amplifier, and coupled to the control grid of V3A, the first mixer. Injection voltage is coupled to the cathode of V3A. Products of mixing are selected in the plate circuit of V3A, tuned to 3.155 to 2.955 mc which is the band-pass i-f frequency. Signals are coupled to the control grid of second mixer V4A with vfo injection voltage applied to the cathode of this tube.

### 3.3 Oscillator Circuits.

**3.3.1 CRYSTAL OSCILLATORS.** High-frequency crystal oscillator V3B provides injection voltage for the first mixer. The crystal oscillator output frequency is always 3.155 mc higher than the lower edge of the selected band. On bands below 12.0 mc, the oscillator plate circuit is tuned to the crystal frequency. At 12.0 mc and higher, the plate circuit is tuned to the second harmonic. The secondary winding of T2 couples injection voltage to the first mixer cathode circuit and furnishes a d-c return

to ground for mixer tube V3A. Dummy load R41 stimulates the load presented by the 32S-3 Transmitter when connected for transceiver operation.

Crystal-controlled bfo V8B and associated circuitry furnishes injection voltage for the product detector. Crystals Y15 and Y16 provide the proper bfo frequency relationships to the mechanical filter passband to yield optimum audio response from the product detector. Crystal Y15 is used for lower sideband reception, and Y16 is used for upper sideband. Capacitor C95 and coil L-12 form a broadly resonant circuit at 455 kc. Oscillator voltage is developed across R49 and coupled by C100 to the cathode of V8A, the product detector tube.

The crystal calibrator circuit provides marker signals at multiples of 100 kc. Variable capacitor C61 provides for adjustment to zero beat with WWV. The output of this oscillator is coupled to the receiver antenna circuits.

**3.3.2 VARIABLE OSCILLATORS.** The vfo uses fixed capacitance and variable inductance to produce the required tuning range of 2.5 to 2.7 mc. Capacitor C303, in the frequency-determining network, is paralleled by variable capacitor C308 in series with diode CR301. This diode switches C308 in or out of the circuit, depending upon the polarity of a bias voltage impressed across the diode junction. The bias voltage is coupled to the diode through R303, and is positive in the USB position causing CR301 to switch C308 into the circuit. When C308 is properly adjusted, it shifts the vfo frequency by an amount equal to the frequency separation of crystals Y15 and Y16. This allows either sideband to be selected without retuning or recalibrating the dial. The vfo output voltage is coupled to the cathode of second mixer tube V4A and to the control grid of cathode follower V4B. The cathode follower prevents loading of the vfo circuits by cable capacity when operated in transceiver service.

Tube V11 and associated circuitry comprise a tunable bfo. The bfo tuning control is potentiometer R81. This control varies a positive d-c voltage applied to the junction of voltage-variable capacitor CR4. The junction capacity of this device is proportional to applied voltage. Adjustment of R81 therefore varies the output frequency of the bfo. Voltage for the tuning circuit is stabilized by a regulator consisting of Zener diode CR5 and resistor R82. Switch S13 completes the cathode circuit of either V8B or V11 thus turning on the desired bfo

## SECTION 3

### Principles of Operation

and turning off the other. The output circuits of both oscillators are coupled to the product detector.

#### 3.4 I-F And Detector Circuits.

Output from the second mixer is coupled to either one of two band-pass filters or 455-kc tuned circuits. A mechanical filter with 2.1-kc nominal bandwidth is provided for SSB reception. A band-pass crystal filter with 250 cps nominal bandwidth is selected in the CW position. For AM reception, two cascaded 455-kc transformers provide increased bandwidth. Output from these circuits is coupled through the Q-multiplier to the first i-f amplifier, V6. The cathode of V6 is returned to ground through potentiometer R57 which is used to set the gain of this stage at a point producing the proper agc threshold. The S-meter circuit is connected from the screen circuits of V6 and V7, the two i-f amplifiers, to the cathode of V7. Under no-signal conditions, the voltage developed across R13 is equal to that developed across R17, and the meter reads zero. Application of agc causes the cathode current of V7 and the combined screen current of V6 and V7 to decrease. The voltage across R17 increases, the voltage across R13 decreases, and the meter reads up-scale by an amount which is proportional to signal strength. Output voltage from the second i-f amplifier is coupled to the product detector, V8A. It is also coupled to separate AM and agc diode detectors. Injection voltage is applied to the cathode of the product detector.

#### 3.5 Q-Multiplier And Notch Filter.

The notch filter is composed of coil L8 and associated capacitors and resistors. The rejection notch occurs at the resonant frequency of this circuit and is centered at 455 kc. Capacitor C132 is mechanically coupled to the REJECTION TUNING control which allows the notch frequency to be moved across the receiver i-f passband. Potentiometer R77 is adjusted to provide optimum Q and depth of notch. Switch S10 shorts the filter circuit in the OFF position. The Q-multiplier is a feedback circuit which includes L8. This circuit multiplies the Q of L8 approximately ten times, thereby obtaining a much deeper and narrower rejection notch than would be provided by the filter alone. The notch shape provided by this circuit allows unwanted signals to be rejected with minimum disturbance to desired signals.

#### 3.6 AGC And Control Circuits.

Signal voltage is coupled from the secondary of transformer T6 to one of the diode plates in V9 and rectified. Agc voltage is developed across R24, the diode load resistor, and is applied to the r-f and i-f amplifier stages. Signal voltage is filtered from the agc line by R50 and C49. Generation of agc voltage is delayed until the signal voltage at the diode plate exceeds the cathode bias on V9. Potentiometer R57 in the cathode

of the first i-f amplifier tube is normally adjusted so that agc action is initiated with a receiver input signal of approximately 1.5 microvolts. This point is referred to as agc threshold. Agc time constant is determined by the amount of capacitance placed in parallel with R24. Added capacity in the SLOW position of the AGC selector produces a slower release characteristic.

Manual control of r-f gain is also accomplished through the agc line. A voltage divider circuit, consisting of resistors R33, R55, and RF GAIN control R56, is connected across the negative 65-volt bias line. At the maximum gain setting, this circuit places a one-volt static bias on the agc line to furnish proper operating bias for r-f amplifier V2. At lower control settings, increased bias is provided which reduces the gain. The d-c grid return for the first mixer stage and MUTE jack J11 are connected to the junction of resistors R33 and R58. When the receiver function switch is placed in the STBY position, a ground at J11 causes the receiver to operate in a normal manner. Removal of this ground causes cutoff bias to be applied to the mixer grid and increased bias on the agc line, thus muting the receiver.

#### 3.7 Audio Circuits.

Audio voltage from the appropriate detector is selected by S8A on the EMISSION switch, and is coupled to the AF GAIN control. The CW SIDETONE jack, J10, is also connected to this point. A sidetone audio voltage of approximately 0.2 volt will produce a normal listening level at average gain settings. Audio is amplified in a two-stage amplifier consisting of tubes V8 and V10. Three audio outputs are provided. Jack J8 is a 4-ohm outlet for a speaker. The headphone jack is connected to a resistive divider across the 500-ohm tap on the output transformer. The divider provides a load for V10 when the impedance of headphones used is relatively high. The ANTI-VOX jack, J12, is also connected to the 500-ohm tap. At normal audio gain settings, 5 to 15 volts of audio are available at J12 for use with the anti-vox circuits in an associated transmitter.

#### 3.8 Power Supply Circuits.

The internal power supply furnishes filament, plate, and bias voltages for the receiver. Bias voltage is obtained by rectifying a portion of the a-c voltage appearing from one leg of the high-voltage secondary to ground. The tube filaments and pilot lamps are connected in a way which allows operation from a 6-, 12-, or 24-volt source. Filament, plate, and bias voltages may be furnished by an external source such as a mobile power supply. Figure 7-1 illustrates the proper connections to the power plug for this type of operation.



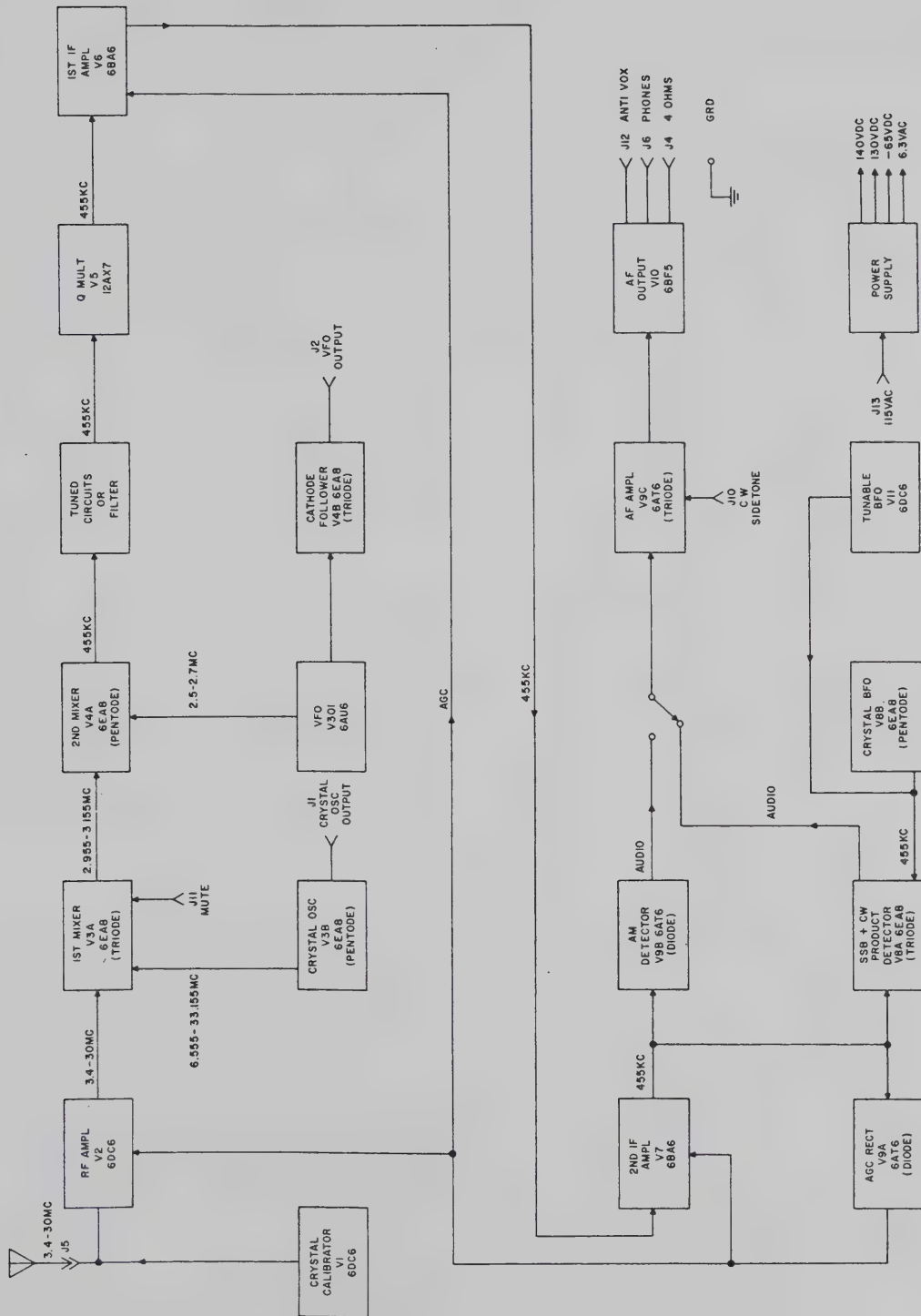


Figure 3-1. Block Diagram





## service instructions

### 4.1 General.

This section covers maintenance and service of 75S-3 and 75S-3A Receivers. It includes information on trouble analysis, signal tracing procedures, voltage and resistance measurements, and alignment procedures. The usefulness of signal level and alignment data given depends upon the accuracy of the test equipment used. Minor adjustments in alignment may be made using the crystal calibrator as a signal source. Except for an occasional touch-up to compensate for possible component aging, alignment normally will be necessary only if frequency-determining components have been replaced. If servicing requires that the cabinet be removed, proceed as follows:

- a. Disconnect all power and external connections.
- b. Lift the lid, and remove the two screws located at the front edge of the cabinet.
- c. Remove the four feet and the screw located midway between the rear feet.
- d. From the rear, push the receiver chassis forward until the front panel protrudes from the cabinet about an inch.
- e. Grasping the front panel at the edges, slide the receiver out of the cabinet.

#### NOTE

DO NOT lubricate the 70K-2 vfo shaft bearings or the dial drive system bearings. The vfo shaft bearings are lubricated at the factory with a special grease. Dial bearings are the Oilite type which are self-lubricating.

Tube filaments and pilot lamps are connected in series-parallel arrangements for 12- or 24-volt operation. When making tube or lamp replacements, be sure that rated filament currents are the same as the original units.

### 4.2 Trouble Analysis.

Most cases of trouble can be traced to defective tubes. Many tube checkers can not duplicate the conditions under which the tubes work in the receiver. Substitution of new tubes will sometimes clear an obscure case of tube trouble. Intermittent trouble conditions in tubes can usually be discovered by lightly tapping the envelope. Occasionally, tube pins or socket terminals will become dirty or

corroded causing an intermittent condition. When this situation is suspected, remove the tube and apply a few drops of contact cleaner to the tube pins. Replace the tube, and work it up and down in the socket a few times. Shorted tubes or capacitors will often cause associated resistors to overheat and crack, blister, or discolor. Making the measurements listed in table 4-1 will help to isolate this type of trouble to a particular stage or component.

A logical process of elimination in conjunction with a study of the main schematic diagram, block diagram, and section 3 will aid in isolating trouble. For example, if the receiver functions properly in the AM position but fails to operate in the SSB or CW positions, trouble in the product detector should be suspected because this circuit is not used for AM reception. As a further check, both beat-frequency oscillators should be alternately switched into the circuit to see if one has failed. A third possibility would be that both beat oscillators have failed.

If the receiver is to be returned to the factory or an authorized service agency, a detailed report of operational difficulties will assist the servicing agency in making repairs with a minimum of time and expense. This is particularly important when intermittent trouble is involved.

### 4.3 Voltage And Resistance Measurements.

Table 4-1 lists typical voltage and resistance readings at each tube socket terminal except those of the vfo tube, V301. Do not open the vfo can. Make all measurements under the following conditions:

- a. Unless otherwise noted in the table, set RF GAIN at maximum, AF GAIN at minimum, EMISSION switch in USB position, function switch in OPR position, tunable bfo off, REJECTION TUNING OFF, and AGC in the FAST position.
- b. Voltage measurements are made with power connected.
- c. Resistance measurements are made with all external cables, including power cable, disconnected. Resistances of less than one ohm are listed as zero.
- d. Make all measurements from indicated socket terminal to chassis ground.

It is recommended that a vtvm be used for these measurements. A vom may be used if it has an input resistance of not less than 20,000 ohms per volt. Voltage measurements made with a vom will yield lower readings in high impedance circuits such as the agc line. Do not use a vom for r-f measurements.

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Service Instructions

TABLE 4-1. VOLTAGE AND RESISTANCE MEASUREMENTS

		TUBE SOCKET TERMINAL								
TUBE		1	2	3	4	5	6	7	8	9
V1	CAL ON DCV CAL OFF DCV ACV OHMS	-52 0 1 MEG	+0.7 52 1000*	0 0	6.3 0	105 142 230K**	51 142 220K**	0 0 0		
V2	DCV ACV OHMS	-0.8 6 MEG	0 0	0 0	6.3 0	138 18K** ①	72 60K**	0 0		
V3	DCV ACV OHMS	112 18K** ①	-11 100K	130 17K** ①	0 0	6.3 0	130 17K** ①	0 0	3.6 1000	0 230K
V4	DCV ACV OHMS	120 18K** ①	0 82	120 18K** ①	6.3 0	0 0	120 19K** ①	4.4 1000	5.4 680	2.7 100K
V5	DCV ACV OHMS	138 18K** ①	-0 100K	1.1 680	0 0	0 0	143 18K** ①	0 340K	1.1 680	6.3 0
V6	DCV ACV OHMS	-0.8 3.7 MEG	0 0	0 0	6.3 0	138 0	74 19K** ①	2.2 22K ①		
V7	DCV ACV OHMS	-0.8 3.6 MEG	0 0	0 0	6.3 0	138 19K** ①	72 23K** ①	0.62 85		
V8	DCV ACV OHMS	46 120K**	-3.2 1 MEG	48 240K**	6.3 0	0 0	112 20K** ①	0 0 ②	0 5	-2.7 5600
V9	DCV ACV OHMS	1.1 680K	2.7 12K	6.3 0	0 0	-0.9 3.5 MEG	0 CW, SB 23 AM ∞ CW, SB 220K AM	100 120K**		
V10	DCV ACV OHMS	-11 250K	0 0	6.3 0	0 0	127 18K** ①	122 18K** ①	-11 250K		
V11	ON DCV OFF DCV ACV OHMS	-2 0 47K	0 25 0 ③	6.3 0	0 0	128 128 20K** ①	30 128 38K**	0 0 0		

\*FUNCTION switch in CAL position

\*\*Resistance may vary depending upon diode and electrolytic condition

① Reverse VOM leads and take highest of the two readings

② Tunable BFO switch OFF

③ Tunable BFO switch ON



TABLE 4-2. SIGNAL LEVELS

SIGNAL INJECTION POINT	GENERATOR OUTPUT FREQUENCY	GENERATOR OUTPUT VOLTAGE	NORMAL INDICATION
V10 - pin 1	1000 cps	5.4 volts	1-watt audio output
V9 - pin 1	1000 cps	0.2 volt	1-watt audio output
V8 - pin 9	455 kc	75 millivolts	1-watt audio output
V8 - pin 6	BFO INJECTION		1.65 volts r-f (each bfo)
V7 - pin 1	455 kc	48 millivolts	Agc threshold
V6 - pin 1	455 kc	175 microvolts	Agc threshold
V4 - pin 6	455 kc	1400 microvolts	Agc threshold
V4 - pin 7	VFO INJECTION		2.0-2.5 r-f volts
V4 - pin 2	3.055 mc	100 microvolts	Agc threshold
V3 - pin 8	HF OSC INJECTION		0.8-2.0 r-f volts
V3 - pin 9	14.1 mc	30 microvolts	Agc threshold
V2 - pin 1	14.1 mc	9 microvolts	Agc threshold
J5 (ANT)	14.1 mc	1.5 microvolts	Agc threshold

#### 4.4 Signal Tracing.

Appropriate test points and normal signal levels are listed in table 4-2. The values listed are nominal. Signal levels in a given receiver may differ from those listed by a factor of plus or minus 20 percent without noticeable degradation in performance. A signal generator with an accurately calibrated output attenuator must be used to provide the r-f signal source voltages indicated. A Hewlett-Packard model 606A or equivalent generator is recommended for this purpose. Be sure to consult the signal generator instruction book for information regarding output termination requirements. Measurements of oscillator injection voltages require the use of an r-f vtm such as the Hewlett-Packard model 410B. Make r-f and audio measurements under the following conditions:

a. For audio measurements, use an audio oscillator as the signal source and an a-c vtm or calibrated oscilloscope to monitor receiver audio output. If desired, an audio wattmeter may be used. Set AF GAIN at maximum, and terminate the 4 $\Omega$  AUDIO output with a four-ohm resistive load.

b. Oscillator injection voltages are measured with an r-f vtm. Measure from cathode to chassis ground at the associated mixer or product detector tube.

c. To check r-f signal levels, connect a d-c vtm to the receiver agc line. Set RF GAIN at maximum. Static d-c voltage on the agc line should be approximately -1.0 volt. Connect the r-f signal generator to the point indicated in the table, and rock the generator dial to produce maximum agc voltage. Starting from minimum output, increase signal generator output to the point where a further increase in signal produces a slight increase in agc voltage. This is agc threshold. Note generator output voltage, and compare with the value listed in the table.

#### 4.5 Alignment Procedure.

Complete alignment of the receiver may be accomplished using the crystal calibrator as a signal source and the S-meter as a peak indicator. To provide a variable output attenuator for the calibrator, connect a .001-uf capacitor to one end of a 5000-ohm carbon potentiometer. Temporarily connect the free end of the capacitor to tube socket terminal 5 of V1, the crystal calibrator. Connect the rotating contact of the potentiometer to ground. Figure 4-1 shows the location of adjustments except for the filter input and output trimmer capacitors. These trimmers are located under the chassis adjacent to the mechanical and crystal filters. The

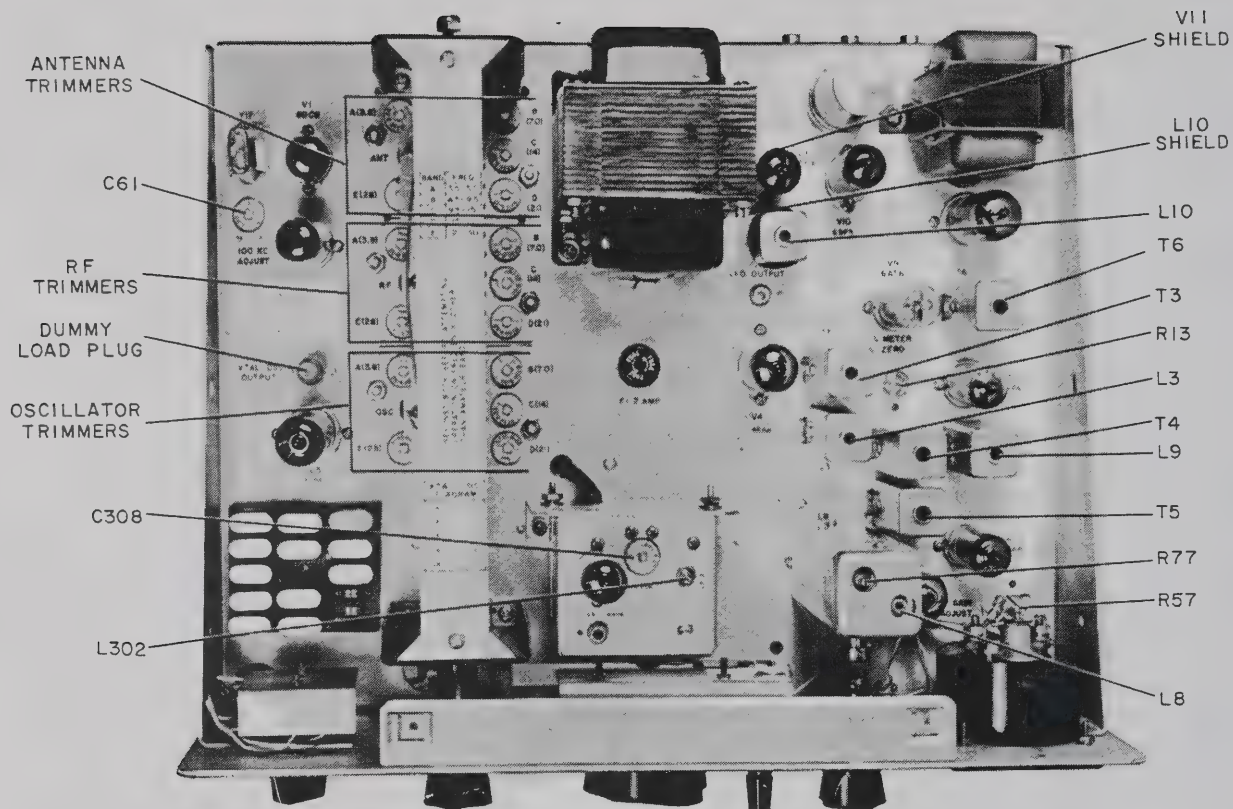


Figure 4-1. Location of Adjustments

rotary ceramic trimmers used in the receiver are at maximum capacity when the large notch is positioned midway between the two mounting screws. Rotation in either direction from this position reduces capacity with minimum being at 180 degrees from maximum.

#### 4.5.1 455-KILOCYCLE I-F ALIGNMENT.

- Set EMISSION switch to USB, and tune to the calibrate signal at 3.7 mc.
- Adjust calibrator output attenuator to provide S-meter reading of approximately S-3.
- Adjust the slugs of L9 and T6 for peak meter reading. Reduce calibrator output as necessary to maintain a low meter reading. Repeat L9 and T6 adjustments.
- Adjust C122 and C123, SSB filter input and output trimmers, for peak meter reading.
- Switch to CW position, and adjust C126 and C127, CW filter input and output trimmers, for

peak meter reading. Rock receiver tuning dial to make sure signal is centered in filter passband.

f. Switch to AM position, and adjust top and bottom slugs of T4 and T5 for peak meter reading. This completes alignment.

g. If a signal generator is used for this alignment, remove vfo tube V301, connect generator to pin 2 of V4, and adjust frequency to center of filter pass band. Align as outlined above, disconnect generator, and replace V301.

#### 4.5.2 BAND-PASS I-F ALIGNMENT.

- Set EMISSION switch to CW, and tune to the calibrate signal at 3.7 mc.
- Make two swamping networks by connecting a .01-uf capacitor in series with a 1000-ohm resistor and connecting alligator clips to the two remaining leads.



c. Connect one swamping network from T3 primary (terminal 1) to ground and the other from L3 (terminal 1) to ground.

d. Adjust attenuator to provide meter reading of approximately S-3.

e. Peak the secondary of T3 (top of can) using a Walsco 2543 or equivalent type tuning tool.

f. Remove both swamping networks and swamp T3 secondary (terminal 3 to ground). Peak T3 primary (bottom of can), and peak L3.

g. Remove swamping network from T3 secondary. This completes band-pass i-f alignment.

h. If a signal generator is used for this alignment, disable the h-f crystal oscillator by removing the crystal for the 3.6-mc band. Connect the signal generator to the XTAL OSC OUTPUT jack, and set to 3.055 mc. Tune receiver to the generator signal at approximately 100 on the dial. Align as above, disconnect generator, and replace crystal.

#### 4.5.3 R-F CIRCUIT ALIGNMENT.

a. Tune to the calibrate signal at 3.7 mc with the EMISSION switch in either USB or LSB position. Connect a 47-ohm resistor or a dummy load such as the DL-1 to the 75S-3/3A ANT jack. During the following procedures, adjust the calibrator output attenuator as necessary to maintain a meter reading of approximately S-3.

b. Set both A (3.8) RF and ANT trimmer capacitors so the large notches point to approximately 2 o'clock when viewed as shown in figure 4-1. Set the A (3.8) OSC trimmer so the large notch points to the rear of the chassis.

c. Set the PRESELECTOR to 2.1 on the logging scale.

d. Adjust the OSC, RF, and ANT slugs located on the movable platform the maximum S-meter indication. Adjust the OSC slug first. After making these adjustments, make sure the PRESELECTOR tuning peaks at 2.1 on the logging scale.

e. Set BAND switch to 28A, PRESELECTOR to 8.9 on the logging scale, and tune to the calibrate signal at 28.6 mc. Maintain S-3 signal level.

f. Adjust E (28) OSC, RF, and ANT trimmer capacitors for peak S-meter reading. Adjust OSC trimmer first.

g. Set BAND switch to 21.0 and PRESELECTOR to 7.9 on the logging scale. Tune to calibrate signal at 21.1 mc. Maintain S-3 signal level.

h. Adjust D (21) OSC, RF, and ANT trimmers for peak S-meter reading. Adjust OSC trimmers first.

i. Set BAND switch to 14.8 and PRESELECTOR to 7.0 on the logging scale. Tune to calibrate signal at 14.9 mc. Maintain S-3 signal level.

j. Adjust C (14) OSC trimmer for peak S-meter reading.

k. Set BAND switch to 14.2 and PRESELECTOR to 6.6 on the logging scale.

l. Adjust C (14) RF and ANT trimmers for peak meter reading. Maintain S-3 signal level.

m. Set BAND switch to 7.0 and PRESELECTOR to 3.9 on the logging scale. Tune to calibrate signal at 7.1 mc. Maintain S-3 signal level.

n. Adjust B OSC, RF, and ANT trimmers for peak S-meter reading. Adjust OSC trimmer first.

o. Disconnect the crystal calibrator output attenuator. This completes r-f alignment.

p. If signal generator and r-f vtvm are used for this alignment, connect the generator output to the receiver ANT jack. Set generator output to frequencies listed, and align RF and ANT trimmers as outlined in preceding steps. Connect r-f vtvm to XTAL OSC OUTPUT jack on bottom side of chassis, leaving load plug P1 in place. Align OSC trimmers as indicated except adjust for peak reading on the vtvm. In step k, adjust PRESELECTOR near 6.6 on logging scale at the point where vtvm reading peaks.

#### 4.5.4 VFO SIDEBAND FREQUENCY SHIFT ADJUSTMENT.

Set EMISSION switch to LSB, and tune to zero beat with calibrate signal at 3.7 mc. Without further movement of the dial, switch to USB, and adjust C308 (on vfo) for zero beat.

#### 4.5.5 CRYSTAL CALIBRATOR ADJUSTMENT.

a. Set receiver for AM reception, and tune to WWV at 15.0-mc at a time when the station is not transmitting tone.

b. Turn function switch to CAL position. Set 100 KC ADJUST trimmer C61 for zero beat of the calibrate signal against WWV.

#### 4.5.6 VFO DIAL CALIBRATION.

Calibrate the dial at 100. If zero beat with the calibrate signal does not occur at 0 and 200  $\pm$  1 kc on the dial, there is end-point spread. If there is no end-point spread, but the hairline is not vertical when the dial is calibrated, a mechanical adjustment only is required. Refer to step h in the following procedure. To correct for end-point spread, make the following adjustments:

a. Set BAND switch to any band and function switch to CAL, and tune calibrate signal to zero beat at 200 end of the dial.

b. Set hairline to 200 with zero set knob.

c. Tune calibrate signal to zero beat at 0 end of the dial. Note the difference in kilocycles between the hairline and dial 0 (example: -1.5 kc).

d. Without moving the hairline, move the dial to the opposite side of 0 by an amount equal to the frequency difference noted above (example: +1.5 kc).

e. Adjust L302 for zero beat. It is located on top of the vfo can.

f. Set the hairline at 0 with zero set knob.

g. Tune the calibrate signal to zero beat at the 200-end of the dial. If zero beat does not occur at exactly 200, repeat steps b through e.

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- h. After adjustment of end points, if the hairline is not vertical in the dial window, loosen the set-screws on the dial hub, and move the dial relative to the oscillator shaft so that, at zero beat, the dials reads 0 to 200 with the hairline vertical.
- i. After these adjustments of the vfo calibration, make the vfo sideband frequency shift adjustment as outlined in paragraph 4.5.4.

#### 4.5.7 TUNABLE BFO ALIGNMENT.

- a. Make sure the BFO tuning knob is correctly positioned on the shaft. At the control end stops, the knob pointer should be at approximately 7 o'clock (ccw end) and 5 o'clock (cw end).
- b. Rotate BFO knob to extreme counterclockwise.
- c. Turn on calibrator and tune receiver to zero beat in USB position.
- d. Turn on tunable bfo, and set BFO knob to 0.
- e. Adjust L10 for zero beat.

#### 4.5.8 NOTCH FILTER ALIGNMENT.

- a. Check REJECTION TUNING knob position. Pointer should be at OFF when the knob is at the counterclockwise stop. Leave at OFF position.
- b. Tune to the calibrate signal on a band which provides a calibrate signal level of approximately S-9 plus

20 db in either USB or LSB position. Center signal in filter passband (approximately 1350-cps tone).

- c. Set REJECTION TUNING knob to midscale (pointer vertical).

- d. Alternately adjust L8 and R77 for maximum depth of notch as indicated by minimum S-meter reading. If the Q-multiplier exhibits a tendency to ring or oscillate, back off slightly on R77.

#### 4.5.9 I-F GAIN ADJUSTMENT.

To set i-f gain control R57, a signal generator with a calibrated output attenuator is required. Connect the signal generator to the receiver ANT jack, and adjust to 1.5 microvolts output at 28.6 mc. Tune the receiver to the generator signal, and adjust R57 to the point which produces a just-perceptible increase above the no-signal reading on the S-meter. Do not make this adjustment until receiver alignment has been completed.

#### 4.5.10 S-METER ZERO ADJUSTMENT.

- a. Set receiver to the middle of any operating band, and peak PRESELECTOR for maximum output.
- b. Set RF GAIN to maximum, and short ANT jack to ground.
- c. Set S-METER ADJUST (R13) so S-meter reads zero.

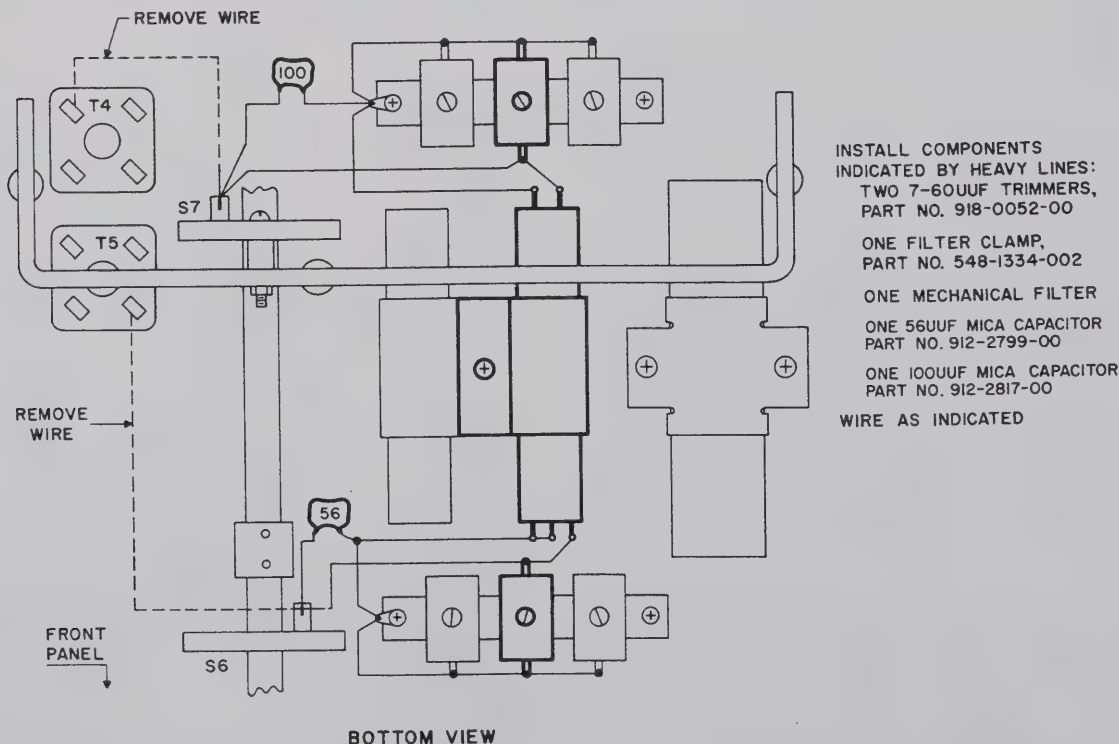


Figure 4-2. Optional Filter Installation Diagram



#### 4.6 Installation of Optional Filters.

Space is provided in the 75S-3/3A to install accessory filters in place of the 455-kc transformers used in the AM function. Figure 4-2 shows the placement of parts and required wiring changes.

To obtain access to the front trimmer-mounting strip, remove the long strip located behind the front panel and fastened by machine screws to the brackets for the front cabinet feet. Bend the mounting tabs on the new trimmer capacitors slightly toward each other, snap the trimmers into place on the trimmer-mounting strips, and solder the appropriate lugs to the ground buses as shown in figure 4-2. Install the filter as shown. If necessary, bend the new filter

clamp slightly to provide a good fit around the filter. One end of the filter has three terminals, one of which has no insulation around it. This is the case ground. Connect this terminal and either one of the two remaining terminals to chassis ground. Either of the terminals on the opposite end of the filter may be used for the ground connection indicated. Dress the new wiring carefully to prevent shorts. Where needed, use spaghetti from removed wiring.

When installation and wiring are completed, turn the receiver on, and tune to the calibrate signal at 14.0 mc. Adjust the filter trimmer capacitors for maximum S-meter reading with the signal centered in the filter passband. Available filters and installation kit of parts are listed in table 5-2.





### 5.1 Frequency Coverage.

Both the 75S-3 and the 75S-3A Receivers are capable of receiving on any frequency within the range of 3.4 to 30.0 mc. Receiver coverage is in increments of 200 kc for each bandswitch setting. The 75S-3 is equipped with 14 crystal sockets, selectable from the front panel. The 75S-3A is equipped with 28 crystal

sockets, selectable from the front panel. With the 12 crystals furnished, both receivers provide complete coverage of 80 meters, 40 meters, 20 meters, 15 meters, WWV at 15 mc, and the 28.5- to 28.7-mc portion of the 10-meter band. Remaining crystal sockets may be used for additional 10-meter coverage. Other crystals may be substituted for those furnished to provide coverage at other frequencies throughout the range.

### 5.2 Equipment Characteristics.

Power requirements . . . . .	115 volts, 50 to 60 cps. Power consumption is approximately 90 watts. Power may be provided by an external supply which delivers 150 volts d-c at 125 ma and -70 volts d-c at 5 ma. Filament power may be a-c or d-c as follows: 6 to 7 volts at 5.5 amperes, 12 to 14 volts at 2.75 amperes, or 24 to 28 volts at 1.375 amperes.
Frequency range . . . . .	3.4 to 30.0 megacycles. With crystals furnished, bands are as follows: 3.4 to 3.6 mc, 3.6 to 3.8 mc, 3.8 to 4.0 mc, 7.0 to 7.2 mc, 7.2 to 7.4 mc, 14.0 to 14.2 mc, 14.2 to 14.4 mc, 14.8 to 15.0 mc, 21.0 to 21.2 mc, 21.2 to 21.4 mc, 21.4 to 21.6 mc, and 28.5 to 28.7 mc.
Mode . . . . .	Selectable single sideband, CW, or AM.
Sensitivity . . . . .	0.5 microvolt for 10-db signal-plus-noise to noise ratio in SSB mode.
Selectivity . . . . .	SSB: 2.1 kc at 6 db down, 4.2 kc at 60 db down. CW: 0.2 kc at 6 db down, 1.25 kc at 60 db down. AM: 4.5 kc at 6 db down, 25 kc at 60 db down.
Spurious response . . . . .	Image rejection better than 50 db. Internal spurious signals below one microvolt equivalent antenna input.
Frequency stability . . . . .	Within 100 cps after warmup.
Dial accuracy . . . . .	Better than one kc on any band after midband calibration.
S-meter calibration . . . . .	Approximately S-9 with 100-uv antenna input signal.
Audio output requirements . . . . .	Speaker: 3 to 4 ohms. Headphones: 500 ohms or higher.
Audio output level . . . . .	0.25 watt at agc threshold. 1.8 watts maximum.
Size . . . . .	7-3/4 in. high, 14-3/4 in. wide, 12-1/2 in. deep.
Weight . . . . .	20 pounds.

### 5.3 Tube, Fuse, Lamp, And Semiconductor Complement.

TABLE 5-1. TUBES, FUSES, LAMPS, AND SEMICONDUCTORS

SYMBOL	FUNCTION	TYPE	SYMBOL	FUNCTION	TYPE
V1	Crystal calibrator	6DC6	V9	AM detector, agc rectifier, audio amplifier	6AT6
V2	R-f amplifier	6DC6			
V3A	First mixer	6EA8	V10	Audio output	6BF5
V3B	Crystal oscillator	6EA8	V11	Tunable BFO	6DC6
V4A	Second mixer	6EA8	V301	VFO	6AU6
V4B	Cathode follower	6EA8	CR1, CR2	Power rectifiers	1N1490
V5	Q-multiplier	12AX7	CR3	Bias rectifier	1N1490
V6	First i-f amplifier	6BA6	CR4	BFO tuning	HC7004
V7	Second i-f amplifier	6BA6	CR5	Voltage regulator	1N732
V8A	Product detector	6EA8	CR301	Switch	1N34A
V8B	Crystal BFO	6EA8	DS1, DS2	Dial lamps	47
			F1	Power supply fuse	2 amp

### 5.4 Available Accessories.

TABLE 5-2. AVAILABLE ACCESSORIES

ITEM	FUNCTION	COLLINS PART NUMBER
312B-3 Speaker	Station speaker	522-1166-00
312B-4 Station Control	Speaker, phone patch, directional wattmeter, and station control switches.	522-1167-00
351E-1 Mounting Plate	Table mount for 75S-3/3A.	522-1479-00
351E-2 Mounting Plate	Table mount for 312B-4.	522-1480-00
351E-3 Mounting Plate	Table mount for 312B-3.	522-1481-00
351R-1 Rack Mount	Rack mount for 75S-3/3A.	522-2665-00
351R-2 Rack Mount	Rack mount for 312B-4.	522-2666-00
Extra crystals	Additional band coverage.	See Parts List.
F455Y-31 Filter	3.1-kc band-pass filter.	526-9338-00
F455Y-40 Filter	4.0-kc band-pass filter.	526-9339-00
F455Y-60 Filter	6.0-kc band-pass filter.	526-9340-00
Filter Installation Kit	Parts for filter installation.	549-5095-00



# 6

## section

### parts list

ITEM	DESCRIPTION	COLLINS PART NUMBER
	75S-3 RECEIVER	522-2562-00
	75S-3A RECEIVER	522-2664-00
C1	CAPACITOR, FIXED, MICA: 510 uuf $\pm 5\%$ , 300 v d-c; Electro Motive part no. DM15F511J-300WV	912-2867-00
C2	CAPACITOR, FIXED, MICA: same as C1	912-2867-00
C3	CAPACITOR, VARIABLE, CERAMIC: 8 to 75 uuf, 350 v d-c; Erie Resistor Corp. part no. 557018 U2P0 34R	917-1075-00
C4	CAPACITOR, FIXED, MICA: 240 uuf $\pm 5\%$ , 500 v d-c; Electro Motive part no. DM15F241J-500WV	912-2843-00
C5	CAPACITOR, VARIABLE, CERAMIC: same as C3	917-1075-00
C6	CAPACITOR, FIXED, MICA: 100 uuf $\pm 5\%$ , 500 v d-c; Electro Motive part no. DM15F101J-500WV	912-2816-00
C7	CAPACITOR, VARIABLE, CERAMIC: same as C3	917-1075-00
C8	CAPACITOR, FIXED, CERAMIC: 0.1 uf -20% +80%, 500 v d-c; Sprague Electric Co. part no. 41C92	913-3152-00
C9	CAPACITOR, VARIABLE, CERAMIC: 5 to 37.5 uuf, 350 v d-c; Erie Resistor Corp. part no. 557018 C0P0 39R	917-1073-00
C10	CAPACITOR, VARIABLE, CERAMIC: same as C9	917-1073-00
C11	CAPACITOR, FIXED, CERAMIC: 1000 uuf +100% -20%, 500 v d-c; Erie Resistor Corp. part no. 851000 X5U0 102Z	913-3009-00
C12	CAPACITOR, FIXED, CERAMIC: 1.0 uuf $\pm 1/4$ uuf, 500 v d-c; Centralab	916-0070-00
C13	CAPACITOR, FIXED, CERAMIC: 10,000 uuf +100% -20%, 500 v d-c; Sprague of Wisc.	913-3013-00
C14	CAPACITOR, FIXED, CERAMIC: same as C11	913-3009-00
C15	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C16	CAPACITOR, VARIABLE, CERAMIC: same as C3	917-1075-00
C17	CAPACITOR, FIXED, MICA: 510 uuf $\pm 2\%$ , 300 v d-c; Electro Motive part no. DM15F511G300WV	912-2866-00
C18	CAPACITOR, VARIABLE, CERAMIC: same as C3	917-1075-00
C19	CAPACITOR, FIXED, MICA: 220 uuf $\pm 5\%$ , 500 v d-c; Electro Motive part no. DM15F221J500WV	912-2840-00
C20	CAPACITOR, VARIABLE, CERAMIC: same as C3	917-1075-00
C21	CAPACITOR, FIXED, MICA: 68 uuf $\pm 10\%$ , 500 v d-c; Electro Motive part no. DM15E680K500WV	912-2805-00
C22	CAPACITOR, VARIABLE, CERAMIC: same as C3	917-1075-00
C23	CAPACITOR, VARIABLE, CERAMIC: same as C9	917-1073-00
C24	P/O T1	
C25	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C26	P/O T1	
C27	CAPACITOR, FIXED, MICA: 15 uuf $\pm 10\%$ , 500 v d-c; Electro Motive part no. DM15C150K500WV	912-2760-00
C28	P/O L4	
C29	CAPACITOR, FIXED, ELECTROLYTIC: 8 uf -15% +100%, 6 v d-c; Sprague Electric part no. D26717	183-1167-00
C30	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C31	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C32	CAPACITOR, FIXED, CERAMIC: same as C11	913-3009-00
C33	CAPACITOR, FIXED, MICA: 220 uuf $\pm 10\%$ , 500 v d-c; Electro Motive part no. DM15F221K500WV	912-2841-00
C34	CAPACITOR, FIXED, CERAMIC: same as C11	913-3009-00
C35	P/O T7	
C36	P/O T7	
C37	CAPACITOR, FIXED, CERAMIC: same as C11	913-3009-00
C38	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C39	P/O L6	
C40	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C41	CAPACITOR, FIXED, MICA: 100 uuf $\pm 10\%$ , 500 v d-c; Electro Motive part no. DM15F101K500WV	912-2817-00
C42	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C43	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00

ITEM	DESCRIPTION	COLLINS PART NUMBER
C44	P/O T2	
C45	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C46	CAPACITOR, FIXED, MICA: 10 uuf $\pm 10\%$ , 500 v d-c; Electro Motive part no. DM15C100K500WV	912-2754-00
C47	NOT USED	
C48	CAPACITOR, FIXED, CERAMIC: same as C11	913-3009-00
C49	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C50	CAPACITOR, FIXED, PAPER: 0.05 uf +30% -10%, 200 v d-c; Sangamo type 33	931-0163-00
C51	CAPACITOR, FIXED, CERAMIC: same as C11	013-3009-00
C52	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C53	CAPACITOR, FIXED, MICA: 470 uuf $\pm 10\%$ , 300 v d-c; Electro Motive part no. DM15F471K300WV	912-2865-00
C54	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C55	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C56	CAPACITOR, FIXED, ELECTROLYTIC: 100 uf -10% +75%, 6 v d-c; Sprague Electric part no. D28121	183-1782-00
C57	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C58	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C59	CAPACITOR, FIXED, ELECTROLYTIC: 3 sections, 40 uf each, -10% +40%, 150 v d-c; Sprague Electric part no. D27999	183-1701-00
C60	CAPACITOR, FIXED, ELECTROLYTIC: 40 uf -10% +100%, 150 v d-c; P. R. Mallory and Co., Inc. part no. TC48	183-1044-00
C61	CAPACITOR, VARIABLE, CERAMIC: same as C3	917-1075-00
C62	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C63	CAPACITOR, FIXED, MICA: same as C41	912-2817-00
C64	CAPACITOR, FIXED, MICA: same as C41	912-2817-00
C65	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C66	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C67	CAPACITOR, FIXED, MICA: 20 uuf $\pm 10\%$ , 500 v d-c; Electro Motive part no. DM15C200K500WV	912-2766-00
C68	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C69	CAPACITOR, VARIABLE, CERAMIC: same as C3	917-1075-00
C70	CAPACITOR, FIXED, MICA: 200 uuf $\pm 5\%$ , 500 v d-c; Electro Motive part no. DM15F201J500WV	912-2837-00
C71	CAPACITOR, VARIABLE, CERAMIC: same as C3	917-1075-00
C72	CAPACITOR, FIXED, MICA: 130 uuf $\pm 5\%$ , 500 v d-c; Electro Motive part no. DM15F131J500WV	912-2825-00
C73	CAPACITOR, VARIABLE, CERAMIC: same as C3	917-1075-00
C74	CAPACITOR, FIXED, MICA: same as C21	912-2805-00
C75	CAPACITOR, VARIABLE, CERAMIC: same as C3	917-1075-00
C76	CAPACITOR, VARIABLE, CERAMIC: same as C3	917-1075-00
C77	CAPACITOR, FIXED, CERAMIC: same as C11	913-3009-00
C78	CAPACITOR, FIXED, MICA: same as C27; used on 75S-3 only	912-2760-00
C79	CAPACITOR, FIXED, MICA: 47 uuf $\pm 10\%$ , 500 v d-c; Electro Motive part no. DM15E470K500WV	912-2793-00
C80	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C81	CAPACITOR, FIXED, MICA: same as C1; p/o T6	912-2867-00
C82	CAPACITOR, FIXED, MICA: same as C67	912-2766-00
C83	CAPACITOR, FIXED, MICA: 120 uuf $\pm 10\%$ , 500 v d-c; Electro Motive part no. DM15F121K500WV	912-2823-00
C84	CAPACITOR, FIXED, MICA: same as C53	912-2865-00
C85	NOT USED	
C86	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C87	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C88	NOT USED	
C89	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C90	CAPACITOR, FIXED, CERAMIC: same as C11	913-3009-00
C91	P/O L4	
C92	CAPACITOR, FIXED, CERAMIC: 3 uuf $\pm 1/4$ uuf, 500 v d-c; Centralab	916-0144-00
C93	CAPACITOR, FIXED, MICA: same as C27	912-2760-00
C94	CAPACITOR, FIXED, MICA: same as C41	912-2817-00
C95	CAPACITOR, FIXED, MICA: same as C4	912-2843-00
C96	NOT USED	

# SECTION 6 Parts List

ITEM	DESCRIPTION	COLLINS PART NUMBER
C97	CAPACITOR, FIXED, CERAMIC: same as C8	913-3152-00
C98	NOT USED	
C99	NOT USED	
C100	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C101	CAPACITOR, FIXED, CERAMIC: 10,000 uuf ±20%, 1000 v d-c; Centralab Div. of Globe Union, Inc. part no. DA134-048CB	913-3922-00
C102	CAPACITOR, FIXED, CERAMIC: 0.05 uf +80% -20%, 500 v d-c; Sprague Electric part no. 33C58 P O T8	913-3153-00
C103	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C104	CAPACITOR, FIXED, CERAMIC: same as C11	913-3009-00
C105	CAPACITOR, FIXED, MICA: same as C53	912-2865-00
C106	CAPACITOR, FIXED, ELECTROLYTIC: 10 uf -10% +100%, 150 v d-c; P. R. Mallory and Co., Inc. part no. TC42	183-1040-00
C107		
C108	P O T8	
C109	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C110	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C111	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C112	CAPACITOR, FIXED, CERAMIC: same as C101	913-3922-00
C113	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C114	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C115	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C116	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C117	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C118	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C119	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C120	CAPACITOR, FIXED, MICA: same as C27	912-2760-00
C121	CAPACITOR, FIXED, MICA: same as C41	912-2817-00
C122	CAPACITOR ASSEMBLY, VARIABLE, MICA: 7 uuf min, 60 uuf max, 350 v d-c; Electro Motive part no. T50410, capacitor; T16328, bracket (includes C126, C127)	918-0058-00
C123	CAPACITOR ASSEMBLY: same as C122	918-0058-00
C124	CAPACITOR, FIXED, MICA: 82 uuf ±10%, 500 v d-c; Electro Motive part no. DM15E820K500WV	912-2811-00
C125	CAPACITOR, FIXED, MICA: 33 uuf ±10%, 500 v d-c; Electro Motive part no. DM15E330K500WV P O C122	912-2781-00
C126	P O C122	
C127	P O C122	
C128	CAPACITOR, FIXED, MICA: 33 uuf ±10%, 500 v d-c; Electro Motive part no. DM15E560K500WV	912-2799-00
C129	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C130	CAPACITOR, FIXED, CERAMIC: same as C11	913-3009-00
C131	CAPACITOR, FIXED, MICA: same as C128	912-2799-00
C132	P O Q Multiplier	
C133	P O Q Multiplier	
C134	P O Q Multiplier	
C135	CAPACITOR, FIXED, CERAMIC: same as C11	913-3009-00
C136	NOT USED	
C137	CAPACITOR, FIXED, PAPER: same as C50	931-0163-00
C138	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C139	NOT USED	
C140	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C141	CAPACITOR, FIXED, MICA: 180 uuf ±10%, 500 v d-c; Electro Motive part no. DM15F181K500WV	912-2835-00
C142	CAPACITOR, FIXED, MICA: same as C141	912-2835-00
C143	P O BFO (L10)	
C144	P O BFO (L10)	
C145	P O BFO (L10)	
C146	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C147	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C148	CAPACITOR, FIXED, MICA: same as C27	912-2760-00
CR1	SEMICONDUCTOR DEVICE, DIODE: silicon, axial lead mtd; metal and glass case, hermetically sealed; 400 v peak inverse voltage, General Electric part no. 1N1490	353-1659-00
CR2	SEMICONDUCTOR DEVICE, DIODE: same as CR1	353-1659-00
CR3	SEMICONDUCTOR DEVICE, DIODE: same as CR1	353-1659-00
CR4	P O BFO Assembly (L10)	
CR5	SEMICONDUCTOR DEVICE, DIODE: silicon, hermetically sealed; Hughes Aircraft	353-2762-00
DS1	LAMP, INCANDESCENT: 6.3 v, 0.15 amp, 1-1 8 in. lg. clear; General Electric part no. 47	262-3240-00
F1	FUSE, CARTRIDGE: 2 amp, 250 v d-c; ferrule terminal; Littlefuse Inc. part no. 312002	264-4070-00
FL1	FILTER, BAND PASS: 455.0-kc operating fre- quency, 300-cycle bandwidth; Midland Mfg. Co. part no. M3-0843	293-0843-00
FL2	FILTER, BAND PASS: 455.0-kc operating fre- quency, 454.30- to 455.70-kc bandwidth	526-9337-00
J1	JACK, TIP: accommodates 1/8 in. plug; ceramic insulation, brass contacts; Cinch Mfg. Corp. part no. 201-11-01-018	360-0088-00

ITEM	DESCRIPTION	COLLINS PART NUMBER
J2	JACK, TIP: same as J1	360-0088-00
J3	NOT USED	
J4	NOT USED	
J5	JACK, TIP: same as J1	360-0088-00
J6	JACK, TELEPHONE: spring leaf contacts, J1-1B contact arrangement; Switchcraft, Inc. part no. 13E	360-0136-00
L1	NOT USED	
L2	NOT USED	
L3	TRANSFORMER AND COIL ASSEMBLY: 3.055-mc frequency, 25/32 in. by 25/32 in. by 2.875 in. overall; Communications Coil part no. X-185-1A and X-185-1B	278-1721-00
L4	COIL, RADIO FREQUENCY: 10,000 uh, 66.5 ohms d-c resistance, 75 ma current, no. 22 AWG tinned copper leads (includes C28, C91); Delevan part no. 2500-76	240-2564-00
L5	COIL, RADIO FREQUENCY: single layer wound, 10-uh inductance; Jeffers Electronics, Div. of Speer Carbon Co. part no. 10102-32	240-0149-00
L6	REACTOR: 1 coil, 3.0-hy inductance, 0.120-amp current, 100 ohms resistance (includes C39); Chicago Standard Transformer Corp. part no. 11272	668-0020-00
L7	COIL, RADIO FREQUENCY: 1000 uh, 16 ohms d-c resistance, 135 ma current, 700 v rms; Delevan Electronics part no. 2500-28	240-2540-00
L8	TRANSFORMER, INTERMEDIATE FREQUENCY: 455 kc; 1-1/4 in. by 1-19/64 in. by 4-3/8 in.; Communications Coil Co. part no. X-565-1	278-0653-00
L9	TRANSFORMER, INTERMEDIATE FREQUENCY: 455 kc; 25/32 in. by 25/32 in. by 3 in. over-all dimensions; Communications Coil Co. part no. X-004-2	278-0277-00
L10	TRANSFORMER, RADIO FREQUENCY: 200 turns litz wire, 1/4 pi wound, 25/32 in. by 25/32 in. by 3 in. overall (includes C143, C144, C145, CR4 and R80); Communications Coil Co. part no. X-453-1	278-0655-00
L11	NOT USED	
L12	COIL, RADIO FREQUENCY: 500 uh, 11 ohms d-c resistance, 170 ma current, 700 v rms; Delevan Electronics part no. 2500-14	240-2533-00
L13	NOT USED	
L14	COIL, RADIO FREQUENCY: 3 pi wound, 225 turns ea, 2.0 mh, no. 40 AWG; Delevan Electronics part no. BS-123	240-0084-00
L15	COIL, RADIO FREQUENCY: same as L14	240-0084-00
L16	COIL, RADIO FREQUENCY: 100 uh, 3.2 ohms d-c resistance, 530 ma current, 700 v rms; Jeffers Electronics Div. of Speer Carbon Co. part no. 10404-34	240-0193-00
M1	VOLTMETER: panel, d-c; meter range 0-1 ma, 0-250 v, 50 scale divisions; Simpson Electric type 127B	458-0044-00
P1	DUMMY LOAD, ELECTRICAL: 100 ohms im- pedance, 1 2 w; 1/2 in. dia by 1.139 in. lg overall; (includes R41)	544-3143-002
P2	NOT USED	
P4		
P5	CABLE ASSEMBLY, SPECIAL PURPOSE, ELEC- TRICAL: 3 conductors no. 18 AWG; 125 v rms working voltage; 0.325 in. dia by 6 ft 0.843 in. lg o a; one end terminated w. plug connector; Belden Mfg. Co. KH3491	426-1464-00
P6	POWER CONNECTOR: 11 female contacts (see W1); Amphenol Borg part no. 78-S11M-1005	372-1952-00
R1	RESISTOR, FIXED, COMPOSITION: 3.3 megohms ±10%, 1/2 w; Allen-Bradley, type EB	745-1499-00
R2	RESISTOR, FIXED, COMPOSITION: 47,000 ohms ±10%, 1/2 w; Allen-Bradley type EB	745-1422-00
R3	RESISTOR, FIXED, COMPOSITION: 1000 ohms ±10%, 1/2 w; Allen-Bradley type EB	745-1352-00
R4	RESISTOR, FIXED, COMPOSITION: 0.22 megohm ±10%, 1/2 w; Allen-Bradley type EB	745-1450-00
R5	RESISTOR, FIXED, COMPOSITION: same as R3	745-1352-00
R6	RESISTOR, FIXED, COMPOSITION: same as R3	745-1352-00
R7	RESISTOR, FIXED, COMPOSITION: 68,000 ohms ±10%, 1/2 w; Allen-Bradley type EB	745-1429-00
R8	RESISTOR, FIXED, COMPOSITION: 68,000 ohms ±10%, 1/2 w; Allen-Bradley type EB	745-1303-00
R9	RESISTOR, FIXED, COMPOSITION: same as R3	745-1352-00
R10	RESISTOR, FIXED, COMPOSITION: same as R3	745-1352-00
R11	RESISTOR, FIXED, COMPOSITION: 0.10 megohm ±10%, 1/2 w; Allen-Bradley type EB	745-1436-00
R12	RESISTOR, FIXED, COMPOSITION: same as R8	745-1303-00



# SECTION 6 Parts List

ITEM	DESCRIPTION	COLLINS PART NUMBER
R13	RESISTOR, VARIABLE, COMPOSITION: 250 ohms $\pm 30\%$ , 0.2 w; Chicago Telephone type 70	376-4602-00
R14	RESISTOR, FIXED, COMPOSITION: same as R3	745-1352-00
R15	RESISTOR, FIXED, COMPOSITION: 15,000 ohms $\pm 10\%$ , 1 w; Allen-Bradley type GB	745-3401-00
R16	RESISTOR, FIXED, COMPOSITION: same as R2	745-1422-00
R17	RESISTOR, FIXED, COMPOSITION: 100 ohms $\pm 10\%$ , 1/2 w; Allen-Bradley type EB	745-1310-00
R18	RESISTOR, FIXED, COMPOSITION: same as R3	745-1352-00
R19	RESISTOR, FIXED, COMPOSITION: same as R11	745-1436-00
R20	NOT USED	
R21	RESISTOR, FIXED, COMPOSITION: same as R8	745-1303-00
R22	RESISTOR, FIXED, COMPOSITION: same as R3	745-1352-00
R23	RESISTOR, FIXED, COMPOSITION: same as R4	745-1450-00
R24	RESISTOR, FIXED, COMPOSITION: same as R1	745-1499-00
R25	RESISTOR, FIXED, COMPOSITION: 5600 ohms $\pm 10\%$ , 1/2 w; Allen-Bradley type EB	745-1384-00
R26	NOT USED	
R27	RESISTOR, FIXED, COMPOSITION: same as R17	745-1310-00
R28	RESISTOR, FIXED, COMPOSITION: same as R11	745-1436-00
R29	RESISTOR, FIXED, COMPOSITION: 6800 ohms $\pm 10\%$ , 1/2 w; Allen-Bradley type EB	745-1387-00
R30	RESISTOR, FIXED, COMPOSITION: same as R2	745-1422-00
R31	RESISTOR, VARIABLE, COMPOSITION: 10,000 ohms $\pm 30\%$ , 1/4 w; (includes R56); Allen-Bradley type CB	376-2151-00
R32	RESISTOR, FIXED, COMPOSITION: 12,000 ohms $\pm 10\%$ , 1/2 w; Allen-Bradley type EB	745-1398-00
R33	RESISTOR, FIXED, COMPOSITION: 330 ohms $\pm 10\%$ , 1/2 w; Allen-Bradley type EB	745-1331-00
R34	RESISTOR, FIXED, COMPOSITION: same as R11	745-1436-00
R35	RESISTOR, FIXED, COMPOSITION: same as R4	745-1450-00
R36	RESISTOR, FIXED, COMPOSITION: 1.0 megohm $\pm 10\%$ , 1/2 w; Allen-Bradley type EB	745-1478-00
R37	RESISTOR, FIXED, COMPOSITION: same as R4	745-1450-00
R38	RESISTOR, FIXED, COMPOSITION: same as R3	745-1352-00
R39	RESISTOR, FIXED, COMPOSITION: same as R11	745-1436-00
R40	RESISTOR, FIXED, COMPOSITION: same as R7	745-1429-00
R41	RESISTOR, FIXED, COMPOSITION: 100 ohms $\pm 10\%$ , 1/2 w; p/o P1; Allen-Bradley type EB	745-1310-00
R42	RESISTOR, FIXED, COMPOSITION: 680 ohms $\pm 10\%$ , 1/2 w; Allen-Bradley type EB	745-1345-00
R43	RESISTOR, FIXED, COMPOSITION: same as R11	745-1436-00
R44	RESISTOR, FIXED, COMPOSITION: same as R11	745-1436-00
R45	RESISTOR, FIXED, COMPOSITION: same as R3	745-1352-00
R46	RESISTOR, FIXED, COMPOSITION: same as R36	745-1478-00
R47	RESISTOR, FIXED, COMPOSITION: 1.5 megohms $\pm 10\%$ , 1/2 w; Allen-Bradley type EB	745-1485-00
R48	RESISTOR, FIXED, COMPOSITION: same as R4	745-1450-00
R49	RESISTOR, FIXED, COMPOSITION: same as R3	745-1352-00
R50	RESISTOR, FIXED, COMPOSITION: 4700 ohms $\pm 10\%$ , 1/2 w; Allen-Bradley type EB	745-1380-00
R51	RESISTOR, FIXED, COMPOSITION: 470 ohms $\pm 10\%$ , 2 w; Allen-Bradley type HB	745-5638-00
R52	RESISTOR, FIXED, COMPOSITION: 3900 ohms $\pm 10\%$ , 2 w; Allen-Bradley type HB	745-5677-00
R53	RESISTOR, FIXED, COMPOSITION: same as R2	745-1422-00
R54	RESISTOR, FIXED, COMPOSITION: 22,000 ohms $\pm 10\%$ , 1/2 w; Allen-Bradley type EB	745-1408-00
R55	RESISTOR, FIXED, COMPOSITION: same as R32	745-1398-00
R56	P/O R31	
R57	RESISTOR, VARIABLE, COMPOSITION: 1000 ohms $\pm 30\%$ , 0.2 w; Chicago Telephone type 70	376-4601-00
R58	RESISTOR, FIXED, COMPOSITION: same as R32	745-1398-00
R59	RESISTOR, FIXED, COMPOSITION: 1000 ohms $\pm 10\%$ , 2 w; Allen-Bradley type HB	745-5652-00
R60	RESISTOR, FIXED, COMPOSITION: same as R11	745-1436-00
R61	RESISTOR, FIXED, COMPOSITION: 470 ohms $\pm 10\%$ , 1/2 w; Allen-Bradley type EB	745-1338-00
R62	RESISTOR, FIXED, COMPOSITION: 10,000 ohms $\pm 10\%$ , 2 w; Allen-Bradley type HB	745-5694-00
R63	RESISTOR, FIXED, COMPOSITION: same as R36	745-1478-00
R64	RESISTOR, FIXED, COMPOSITION: same as R11	745-1436-00
R65	RESISTOR, FIXED, COMPOSITION: same as R36	745-1478-00
R66	RESISTOR, FIXED, COMPOSITION: same as R61	745-1338-00
R67	RESISTOR, FIXED, COMPOSITION: 1200 ohms $\pm 10\%$ , 1/2 w; Allen-Bradley type EB	745-1356-00
R68	RESISTOR, FIXED, COMPOSITION: same as R50	745-1380-00
R69	RESISTOR, FIXED, COMPOSITION: same as R2	745-1422-00
R70	RESISTOR, FIXED, COMPOSITION: same as R11	745-1436-00
R71	RESISTOR, FIXED, COMPOSITION: same as R42	745-1345-00
R72	RESISTOR, FIXED, COMPOSITION: 120 ohms $\pm 10\%$ , 1/2 w; Allen-Bradley type EB	745-1314-00
R73	RESISTOR, FIXED, COMPOSITION: same as R3	745-1352-00

ITEM	DESCRIPTION	COLLINS PART NUMBER
R74	RESISTOR, FIXED, COMPOSITION: 0.33 megohm $\pm 10\%$ , 1/2 w; Allen-Bradley type EB	745-1457-00
R75	RESISTOR, FIXED, COMPOSITION: 47 ohms $\pm 10\%$ , 1/2 w; Allen-Bradley type EB	745-1296-00
R76	P/O Q Multiplier	
R77	P/O Q Multiplier	
R78	RESISTOR, FIXED, COMPOSITION: same as R74	745-1457-00
R79	RESISTOR, FIXED, COMPOSITION: same as R2	745-1422-00
R80	P/O BFO (L10)	
R81	RESISTOR, VARIABLE: 100,000 ohms $\pm 30\%$ , 1/4 w (includes S13); Allen-Bradley type CB	376-2530-00
R82	RESISTOR, FIXED, COMPOSITION: 27,000 ohms $\pm 10\%$ , 1/2 w; Allen-Bradley type EB	745-1412-00
R83	RESISTOR, FIXED, COMPOSITION: 39,000 ohms $\pm 10\%$ , 1/2 w; Allen-Bradley type EB	745-1419-00
R84	RESISTOR, FIXED, COMPOSITION: 10,000 ohms $\pm 10\%$ , 1/2 w; Allen-Bradley type EB	745-1394-00
R85	RESISTOR, FIXED, COMPOSITION: same as R84	745-1394-00
R86	RESISTOR, FIXED, COMPOSITION: same as R3	745-1352-00
R87	RESISTOR, FIXED, COMPOSITION: same as R75	745-1296-00
S1A	SWITCH, ROTARY: 1 circuit, 14 position, 1 section; 1 moving, 16 fixed contacts; Oak Mfg. Co. part no. 91873-OK1	259-0981-00
S1B	SWITCH SECTION, ROTARY: 1 circuit (1 pole) 14 position, 1 moving, 16 fixed contacts (p/o 75S-3A only); Oak Mfg. Co. type CK	269-1977-00
S2	SWITCH SECTION, ROTARY: 1 circuit, 14 position, 1 moving, 10 fixed contacts; Oak Mfg. Co. type CK	269-2027-00
S3	SWITCH SECTION, ROTARY: same as S2	269-2027-00
S4	SWITCH SECTION, ROTARY: same as S2	269-2027-00
S5	SWITCH SECTION, ROTARY: 1 section, 4 position, 3 circuit, 12 fixed, 3 moving contacts; Oak Mfg. Co. type F	259-0949-00
S6	P/O S11	
S7	SWITCH SECTION, ROTARY: 2 circuit (2 pole) 12 position, 2 moving, 11 fixed contacts; Oak Mfg. Co.	269-2309-00
S8	SWITCH SECTION, ROTARY: 2 circuit (2 pole) 12 position, 2 moving, 10 fixed contacts; Oak Mfg. Co. part no. 218156-F	269-2310-00
S9	SWITCH SECTION, ROTARY: 2 circuit (2 pole) 12 position, 2 moving, 9 fixed contacts; Oak Mfg. Co. type F	269-2311-00
S10	P/O Q Multiplier	
S11	SWITCH, ROTARY: 3 circuit (3 pole) 4 position, 3 moving, 14 fixed contacts (includes S6); Oak Mfg. Co. part no. 217828-52	259-1483-00
S12	SWITCH, ROTARY: 1 circuit (1 pole) 3 position, 1 moving, 4 fixed contacts; Grigsby Co., Inc. type 4 MLR	259-1491-00
S13	P/O R81	
S14	SWITCH, ROTARY: 1 circuit (1 pole) 2 position, 1 moving contact, 3 fixed contacts (p/o 75S-3A only); Oak Mfg. Co. part no. 191774-23	259-0980-00
T1	TRANSFORMER, RADIO FREQUENCY: 3.4 to 30 mc; (includes C24, C26)	543-8120-002
T2	TRANSFORMER, RADIO FREQUENCY: 3.4 to 30 mc; (includes C44, C81)	543-8122-002
T3	TRANSFORMER AND COIL ASSEMBLY: 3.055 mc freq; 25/32 in. by 25/32 in. by 2.875 in. overall; Communications Coil part no. X-185-1A and X-185-1B	278-1721-00
T4	TRANSFORMER, INTERMEDIATE FREQUENCY: 440- to 470-kc frequency range; Communications Coil part no. X-083-1	278-0281-00
T5	TRANSFORMER, INTERMEDIATE FREQUENCY: same as T4	278-0281-00
T6	TRANSFORMER, INTERMEDIATE FREQUENCY: same as T4	278-0281-00
T7	TRANSFORMER, AUDIO FREQUENCY: pri 2500 ohms; sec. 500 ohms and 4 ohms (includes C35, C36); Stancor Electronics part no. 27232	667-0302-00
T8	TRANSFORMER, POWER: pri. 115 v, 50/60 cps, sec. no. 1, overall 220 v CT; sec. no. 2, 6.3 v (includes C103, C108); Stancor Electronics part no. 27868	662-0301-00
V1	ELECTRON TUBE: glass envelope; pentode; Radio Corp. of America part no. 6DC6	255-0226-00
V2	ELECTRON TUBE: same as V1	255-0226-00
V3	ELECTRON TUBE: miniature pentode; Radio Corp. of America part no. 6EA8	255-0379-00
V4	ELECTRON TUBE: same as V3	255-0379-00

# SECTION 6

## Parts List

ITEM	DESCRIPTION	COLLINS PART NUMBER
V5	ELECTRON TUBE: twin triode; Radio Corp. of America part no. 12AX7	255-0201-00
V6	ELECTRON TUBE: glass envelope; pentode; Radio Corp. of America part no. 6BA6	255-0185-00
V7	ELECTRON TUBE: same as V6	255-0185-00
V8	ELECTRON TUBE: same as V3	255-0379-00
V9	ELECTRON TUBE: same as V1	255-0226-00
V10	ELECTRON TUBE: duplex-diode-triode; Radio Corp. of America part no. 6AT6	255-0190-00
V11	ELECTRON TUBE: pentode; General Electric Co. part no. 6BF5	255-0330-00
W1	CABLE ASSEMBLY: 3 conductor no. 18 AWG, A. C. plug and power connector (P6)	544-3121-00
XDS1	LAMPHOLDER: for use with miniature bayonet bulb; 1-3/8 in. lg o/a; Micarta Fabrications, Inc. part no. DB718	262-1210-00
XF1	FUSEHOLDER: extractor post type; 125 v, 5 amp; accommodates 3AG cartridge fuse; Bussman Mfg. Co. part no. HKP1-16	265-1002-00
XV1	SOCKET, ELECTRON TUBE: 7-pin miniature; molded construction; low loss composition; 0.343 in. h, 0.812 in. w, 1.125 in. lg o/a dim., excl terminals; Elco Mfg. Co., Inc. part no. 241BC	220-1044-00
XV2	SOCKET, ELECTRON TUBE: same as XV1	220-1044-00
XV3	SOCKET, ELECTRON TUBE: 9-pin miniature; molded construction; low loss composition; Elco Mfg. Co., Inc. part no. 274BC	220-1054-00
XV4	SOCKET, ELECTRON TUBE: same as XV3	220-1054-00
XV5	SOCKET, ELECTRON TUBE: same as XV3	220-1054-00
XV6	SOCKET, ELECTRON TUBE: same as XV1	220-1044-00
XV7	SOCKET, ELECTRON TUBE: same as XV1	220-1044-00
XV8	SOCKET, ELECTRON TUBE: same as XV3	220-1054-00
XV9	SOCKET, ELECTRON TUBE: same as XV1	220-1044-00
XV10	SOCKET, ELECTRON TUBE: same as XV1	220-1044-00
XV11	SOCKET, ELECTRON TUBE: same as XV1	220-1044-00
Y1	CRYSTAL UNIT, QUARTZ: 6.555-mc crystal frequency; 3.4- to 3.6-mc operating frequency; Midland Mfg. Co. part no. MO 8728	290-8729-00
Y2	CRYSTAL UNIT, QUARTZ: 6.755-mc crystal frequency; 3.6- to 3.8-mc operating frequency; Midland Mfg. Co. part no. MO 8729	290-8730-00
Y3	CRYSTAL UNIT, QUARTZ: 6.955-mc crystal frequency; 3.8- to 4.0-mc operating frequency; Midland Mfg. Co. part no. MO 8730	290-8731-00
Y4	CRYSTAL UNIT, QUARTZ: 10.155-mc crystal frequency; 7.0- to 7.2-mc operating frequency; Midland Mfg. Co. part no. MO 8731	290-8732-00
Y5	CRYSTAL UNIT, QUARTZ: 10.355-mc crystal frequency; 7.2- to 7.4-mc operating frequency; Midland Mfg. Co. part no. MO 8732	290-8733-00
Y6	CRYSTAL UNIT, QUARTZ: 8.5775-mc crystal frequency; 14.0- to 14.2-mc operating frequency; Midland Mfg. Co. part no. MO 8733	290-8734-00
Y7	CRYSTAL UNIT, QUARTZ: 8.6775-mc crystal frequency; 14.2- to 14.4-mc operating frequency; Midland Mfg. Co. part no. MO 8734	290-8735-00
Y8	CRYSTAL UNIT, QUARTZ: 8.9775-mc crystal frequency; 14.8- to 15.0-mc operating frequency; Midland Mfg. Co. part no. MO 8735	290-8736-00
Y9	CRYSTAL UNIT, QUARTZ: 12.0775-mc crystal frequency; 21.0- to 21.2-mc operating frequency; Midland Mfg. Co. part no. MO 8736	290-8737-00
Y10	CRYSTAL UNIT, QUARTZ: 12.1775-mc crystal frequency; 21.2- to 21.4-mc operating frequency; Midland Mfg. Co. part no. MO 8737	290-8738-00
Y11	CRYSTAL UNIT, QUARTZ: 12.2775-mc crystal frequency; 21.4- to 21.6-mc operating frequency; Midland Mfg. Co. part no. MO 8738	290-8691-00
Y12	CRYSTAL UNIT, QUARTZ: 15.8275-mc crystal frequency; 28.5- to 28.7-mc operating frequency; Midland Mfg. Co. part no. MO 8691	
Y13	NOT USED	

ITEM	DESCRIPTION	COLLINS PART NUMBER
Y14	NOT USED	
Y15	CRYSTAL UNIT, QUARTZ: 453.650-kc frequency; Midland Mfg. Co. part no. MO 8705	290-8705-00
Y16	CRYSTAL UNIT, QUARTZ: 456.350-kc frequency; Midland Mfg. Co. part no. MO 8706	290-8706-00
Y17	CRYSTAL UNIT, QUARTZ: 100.000-kc frequency; Billey Electric Co.	290-8454-00
70K-2 OSCILLATOR		522-1093-00
*C301	CAPACITOR, FIXED, CERAMIC: 20 uuf $\pm 20\%$ , 500 v d-c; Centralab part no. DA933-051	913-2879-00
*C301	CAPACITOR, FIXED, CERAMIC: 20 uuf $\pm 20\%$ , 500 v d-c; Centralab part no. DA933-050	913-2880-00
*C301	CAPACITOR, FIXED, CERAMIC: 20 uuf $\pm 20\%$ , 500 v d-c; Centralab part no. DA933-049	913-2881-00
*C301	CAPACITOR, FIXED, CERAMIC: 20 uuf $\pm 20\%$ , 500 v d-c; Centralab part no. DA933-048	913-2882-00
*C301	CAPACITOR, FIXED, CERAMIC: 20 uuf $\pm 20\%$ , 500 v d-c; Centralab part no. DA934-042	913-2883-00
*C301	CAPACITOR, FIXED, CERAMIC: 20 uuf $\pm 20\%$ , 500 v d-c; Centralab part no. DA934-038	913-2884-00
*C301	CAPACITOR, FIXED, CERAMIC: 100 uuf $\pm 20\%$ , 500 v d-c; Centralab part no. DA931-022	913-2897-00
*C301	CAPACITOR, FIXED, CERAMIC: 100 uuf $\pm 20\%$ , 500 v d-c; Centralab part no. DA931-020	913-2898-00
*C301	CAPACITOR, FIXED, CERAMIC: 100 uuf $\pm 20\%$ , 500 v d-c; Centralab part no. DA932-008	913-2899-00
*C301	CAPACITOR, FIXED, CERAMIC: 100 uuf $\pm 20\%$ , 500 v d-c; Centralab part no. DA932-009	913-2900-00
C302	CAPACITOR, FIXED, MICA: 1000 uuf $\pm 1\%$ , 500 v d-c; Electro Motive part no. DM20F102F500WV	912-1749-00
C303	CAPACITOR, FIXED, MICA: 3000 uuf $\pm 10\%$ , 500 v d-c; Electro Motive part no. DM20F302F500WV	912-1748-00
C304	CAPACITOR, FIXED, MICA: 200 uuf $\pm 1\%$ , 300 v d-c; Electro Motive part no. DM15E201F300WV	912-3468-00
*C305	CAPACITOR, FIXED, CERAMIC: 100 uuf $\pm 2\%$ , 500 v d-c; Centralab part no. DA932-005	913-0074-00
*C305	CAPACITOR, FIXED, CERAMIC: 100 uuf $\pm 2\%$ , 500 v d-c; Centralab part no. DA933-017	913-0246-00
C306	CAPACITOR, FIXED, CERAMIC: 0.02 uf $\pm 60\%$ -40%, 250 v d-c; Sprague Electric Co. part no. 20C109	913-2097-00
C307	CAPACITOR, FIXED, CERAMIC: same as C306	917-1073-00
C308	CAPACITOR, VARIABLE, CERAMIC: 5.0 uuf min to 37.5 uuf max, 350 v d-c; Erie Resistor part no. 557018 C0P0 39R	
C309	CAPACITOR, FIXED, CERAMIC: same as C306	913-2097-00
C310	CAPACITOR, FIXED, CERAMIC: same as C306	913-2097-00
CR301	DIODE: germanium; Sylvania part no. 1N34A	353-0103-00
L301	TRIMMER ASSEMBLY: Special	543-7323-00
L302	TRIMMER ASSEMBLY: same as L301	543-7323-00
L303	INDUCTOR, TUNING: Special	543-7333-00
L304	COIL, RADIO FREQUENCY: single layer wound, magnet wire, 3.30-uh inductance; Delevan Electronics	240-0695-00
R301	RESISTOR, COMPOSITION: 0.10 megohm $\pm 10\%$ , 1/2 w; Allen-Bradley type EB	745-1436-00
R302	RESISTOR, COMPOSITION: 82,000 ohms $\pm 10\%$ , 1/2 w; Allen-Bradley type EB	745-1433-00
R303	RESISTOR, COMPOSITION: same as R301	745-1436-00
T301	TRANSFORMER, RADIO FREQUENCY: pri. 380 uh nom, 790 kc; sec. 2.7 uh nom, 2.6 mc; Communication Coil	240-0665-00
V301	ELECTRON TUBE: type 6AU6; General Electric part no. 6AU6	255-0202-00

\*Select per operational requirement.



GENERAL COVERAGE CRYSTALS AVAILABLE								
CRYSTAL FREQUENCY (kc)	FOR OPERATING FREQUENCY (mc)	PART NUMBER	CRYSTAL FREQUENCY (kc)	FOR OPERATING FREQUENCY (mc)	PART NUMBER	CRYSTAL FREQUENCY (kc)	FOR OPERATING FREQUENCY (mc)	PART NUMBER
6555.000	3.4-3.6	290-9009-00	8577.500	14.0-14.2	290-9062-00	12977.500	22.8-23.0	290-9106-00
6755.000	3.6-3.8	290-9010-00	8652.500	14.15-14.35	290-9180-00	13077.500	23.0-23.2	290-9107-00
6955.000	3.8-4.0	290-9011-00	8677.500	14.2-14.4	290-9063-00	13177.500	23.2-23.4	290-9108-00
7155.000	4.0-4.2	290-9012-00	8777.500	14.4-14.6	290-9064-00	13277.500	23.4-23.6	290-9109-00
7355.000	4.2-4.4	290-9013-00	8877.500	14.6-14.8	290-9065-00	13377.500	23.6-23.8	290-9110-00
7555.000	4.4-4.6	290-9014-00	8977.500	14.8-15.0	290-9066-00	13477.500	23.8-24.0	290-9111-00
7755.000	4.6-4.8	290-9015-00	9077.500	15.0-15.2	290-9067-00	13577.500	24.0-24.2	290-9112-00
7955.000	4.8-5.0	290-9016-00	9177.500	15.2-15.4	290-9068-00	13677.500	24.2-24.4	290-9113-00
9755.000	6.6-6.8	290-9025-00	9277.500	15.4-15.6	290-9069-00	13777.500	24.4-24.6	290-9114-00
9955.000	6.8-7.0	290-9026-00	9377.500	15.6-15.8	290-9070-00	13877.500	24.6-24.8	290-9115-00
10155.000	7.0-7.2	290-9027-00	9477.500	15.8-16.0	290-9071-00	13977.500	24.8-25.0	290-9116-00
10355.000	7.2-7.4	290-9028-00	9577.500	16.0-16.2	290-9072-00	14077.500	25.0-25.2	290-9117-00
10555.000	7.5-7.6	290-9029-00	9677.500	16.2-16.4	290-9073-00	14177.500	25.2-25.4	290-9118-00
10755.000	7.4-7.6	290-9030-00	9777.500	16.4-16.6	290-9074-00	14277.500	25.4-25.6	290-9119-00
10955.000	7.8-8.0	290-9031-00	9877.500	16.6-16.8	290-9075-00	14377.500	25.6-25.8	290-9120-00
11155.000	8.0-8.2	290-9032-00	9977.500	16.8-17.0	290-9076-00	14477.500	25.8-26.0	290-9121-00
11355.000	8.2-8.4	290-9033-00	10077.500	17.0-17.2	290-9077-00	14577.500	26.0-26.2	290-9122-00
11555.000	8.4-8.6	290-9034-00	10177.500	17.2-17.4	290-9078-00	14677.500	26.2-26.4	290-9123-00
11755.000	8.6-8.8	290-9035-00	10277.500	17.4-17.6	290-9079-00	14777.500	26.4-26.6	290-9124-00
11955.000	8.8-9.0	290-9036-00	10377.500	17.6-17.8	290-9080-00	14877.500	26.6-26.8	290-9125-00
12155.000	9.0-9.2	290-9037-00	10477.500	17.8-18.0	290-9081-00	14977.500	26.8-27.0	290-9126-00
12355.000	9.2-9.4	290-9038-00	10577.500	18.0-18.2	290-9082-00	15077.500	27.0-27.2	290-9127-00
12555.000	9.4-9.6	290-9039-00	10677.500	18.2-18.4	290-9083-00	15177.500	27.2-27.4	290-9128-00
12755.000	9.6-9.8	290-9040-00	10777.500	18.4-18.6	290-9084-00	15277.500	27.4-27.6	290-9129-00
12955.000	9.8-10.0	290-9041-00	10877.500	18.6-18.8	290-9085-00	15377.500	27.6-27.8	290-9130-00
13155.000	10.0-10.2	290-9042-00	10977.500	18.8-19.0	290-9086-00	15477.500	27.8-28.0	290-9131-00
13355.000	10.2-10.4	290-9043-00	11077.500	19.0-19.2	290-9087-00	15527.500	27.9-28.1	290-9142-00
13555.000	10.4-10.6	290-9044-00	11177.500	19.2-19.4	290-9088-00	15577.500	28.0-28.2	290-9132-00
13755.000	10.6-10.8	290-9045-00	11277.500	19.4-19.6	290-9089-00	15627.500	28.1-28.3	290-9143-00
13955.000	10.8-11.0	290-9046-00	11377.500	19.6-19.8	290-9090-00	15677.500	28.2-28.4	290-9133-00
14155.000	11.0-11.2	290-9047-00	11477.500	19.8-20.0	290-9091-00	15727.500	28.3-28.5	290-9144-00
14355.000	11.2-11.4	290-9048-00	11577.500	20.0-20.2	290-9092-00	15777.500	28.4-28.6	290-9134-00
14555.000	11.4-11.6	290-9049-00	11677.500	20.2-20.4	290-9093-00	15827.500	28.5-28.7	290-9201-00
14755.000	11.6-11.8	290-9050-00	11777.500	20.4-20.6	290-9094-00	15877.500	28.6-28.8	290-9135-00
14955.000	11.8-12.0	290-9051-00	11877.500	20.6-20.8	290-9095-00	15927.500	28.7-28.9	290-9145-00
7577.500	12.0-12.2	290-9052-00	11977.500	20.8-21.0	290-9096-00	15977.500	28.8-29.0	290-9136-00
7677.500	12.2-12.4	290-9053-00	12077.500	21.0-21.2	290-9097-00	16027.500	28.9-29.1	290-9146-00
7777.500	12.4-12.6	290-9054-00	12177.500	21.2-21.4	290-9098-00	16077.500	29.0-29.2	290-9137-00
7877.500	12.6-12.8	290-9055-00	12277.500	21.4-21.6	290-9099-00	16127.500	29.1-29.3	290-9147-00
7977.500	12.8-13.0	290-9056-00	12377.500	21.6-21.8	290-9100-00	16177.500	29.2-29.4	290-9138-00
8077.500	13.0-13.2	290-9057-00	12477.500	21.8-22.0	290-9101-00	16227.500	29.3-29.5	290-9148-00
8177.500	13.2-13.4	290-9058-00	12577.500	22.0-22.2	290-9102-00	16277.500	29.4-29.6	290-9139-00
8277.500	13.4-13.6	290-9059-00	12677.500	22.2-22.4	290-9103-00	16327.500	29.5-29.7	290-9149-00
8377.500	13.6-13.8	290-9060-00	12777.500	22.4-22.6	290-9104-00	16377.500	29.6-29.8	290-9140-00
8477.500	13.8-14.0	290-9061-00	12877.500	22.6-22.8	290-9105-00	16477.500	29.8-30.0	290-9141-00

SECTION 6  
Parts List

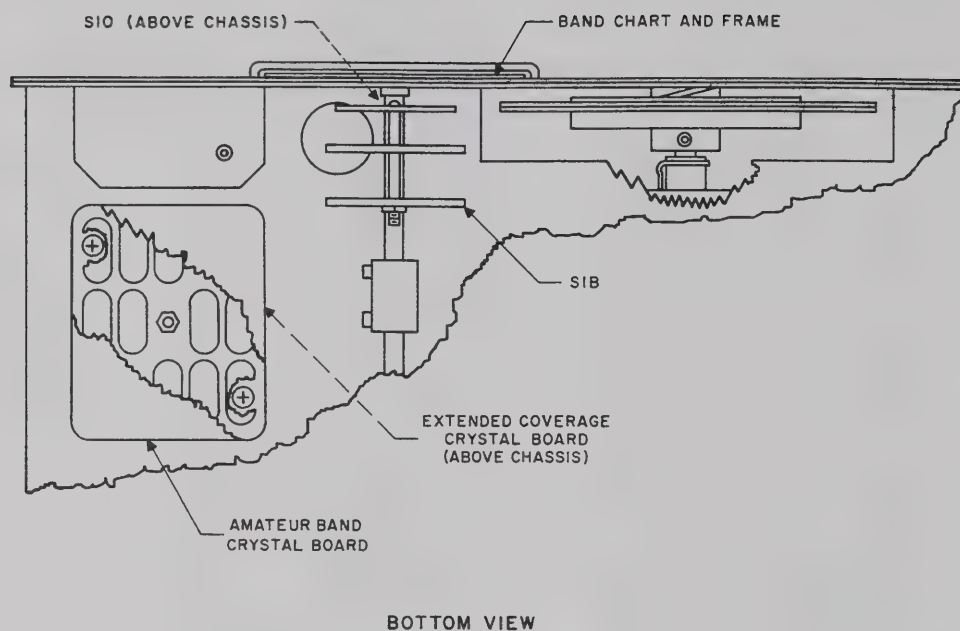


Figure 6-1. 75S-3A, Location of Added Components

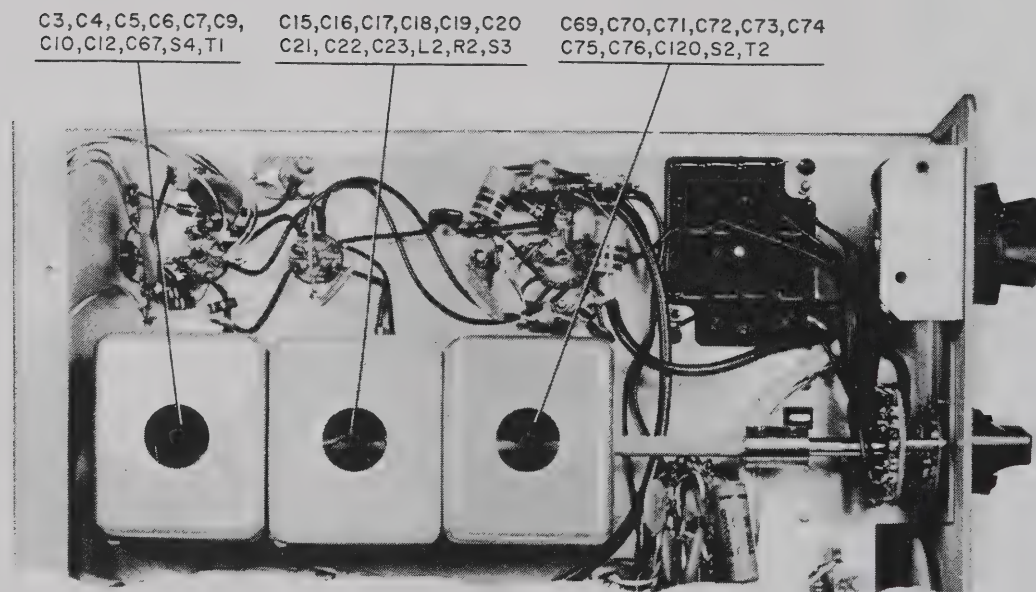


Figure 6-2. Bottom Right View, Parts Location



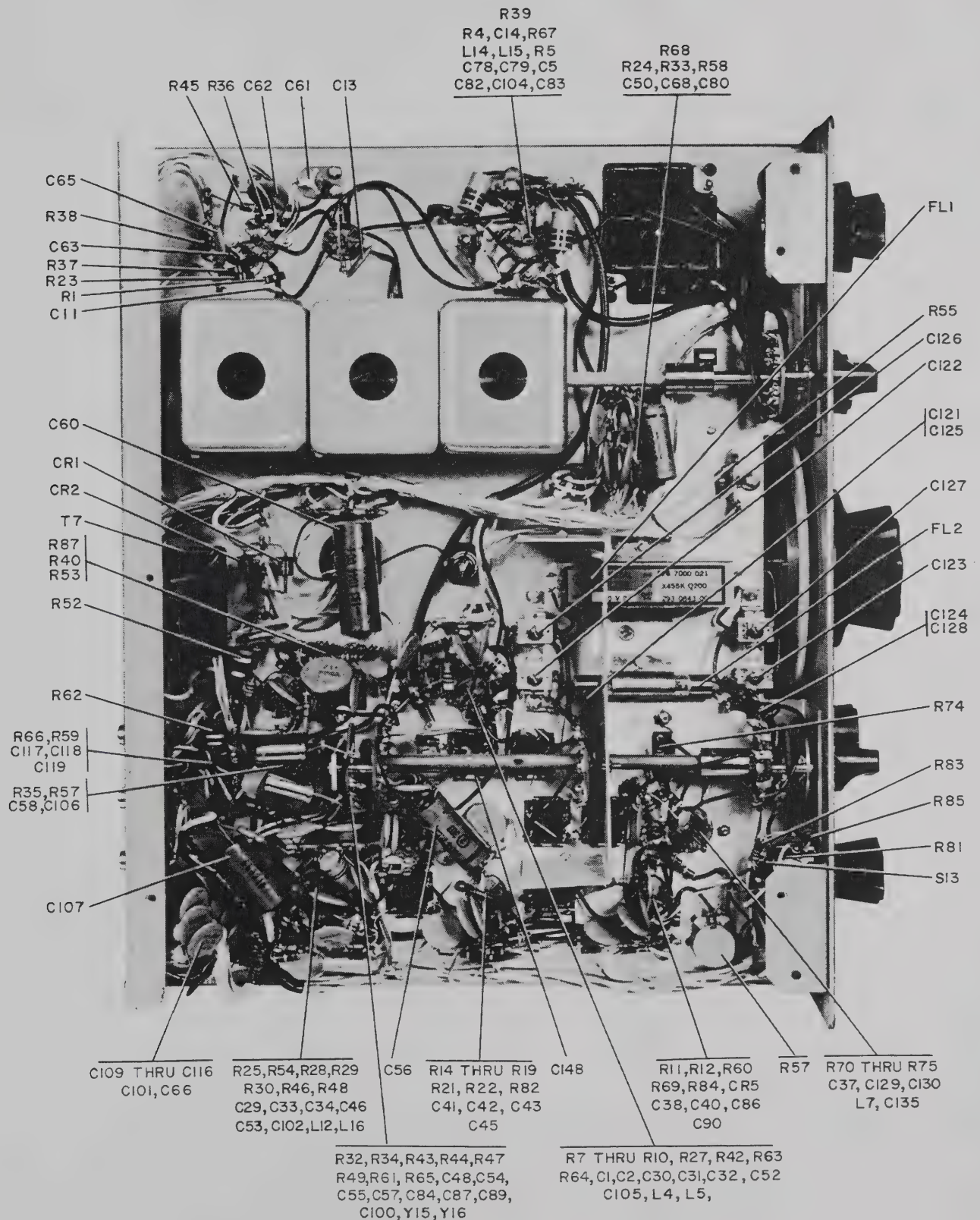
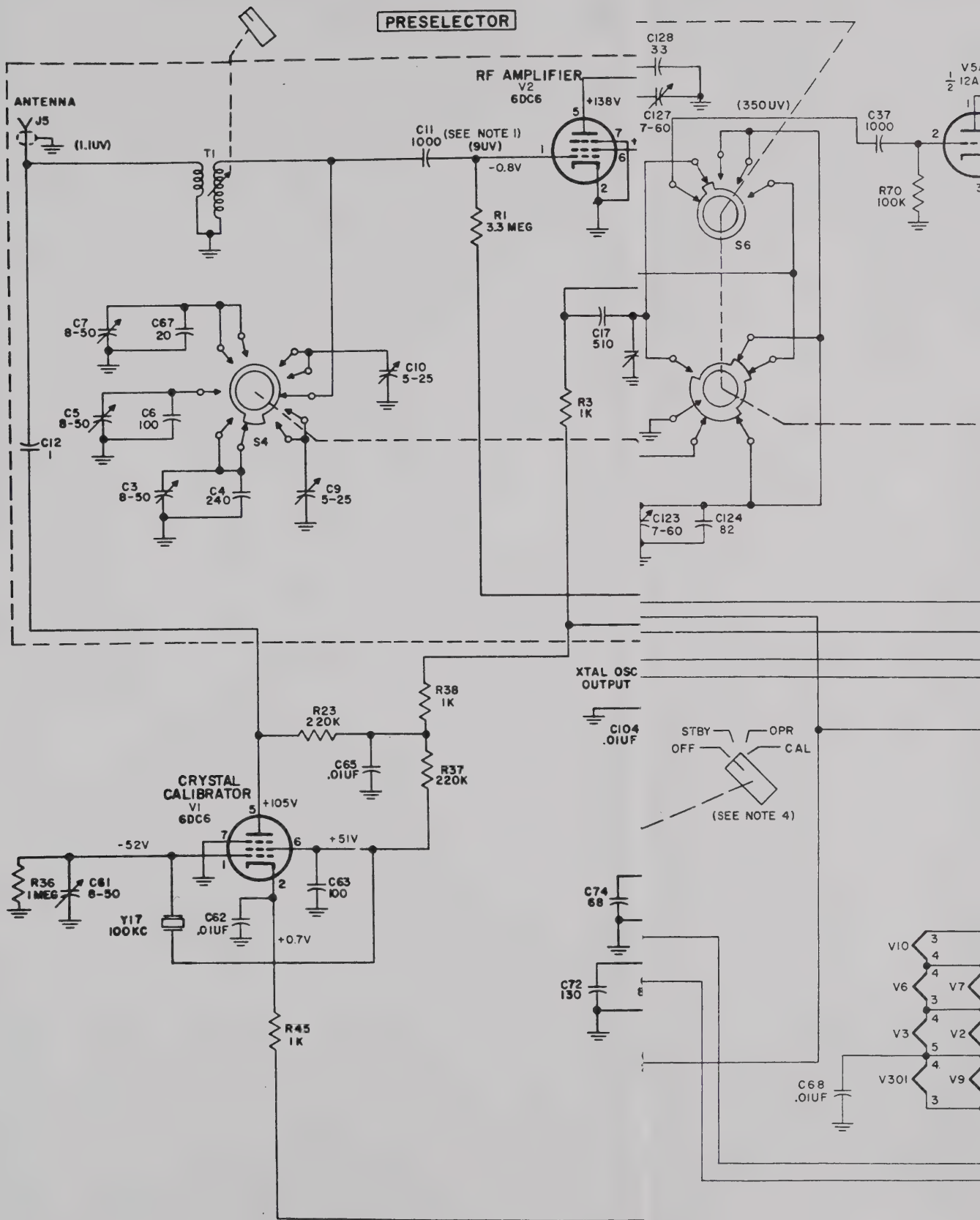


Figure 6-3. Bottom View, Parts Location

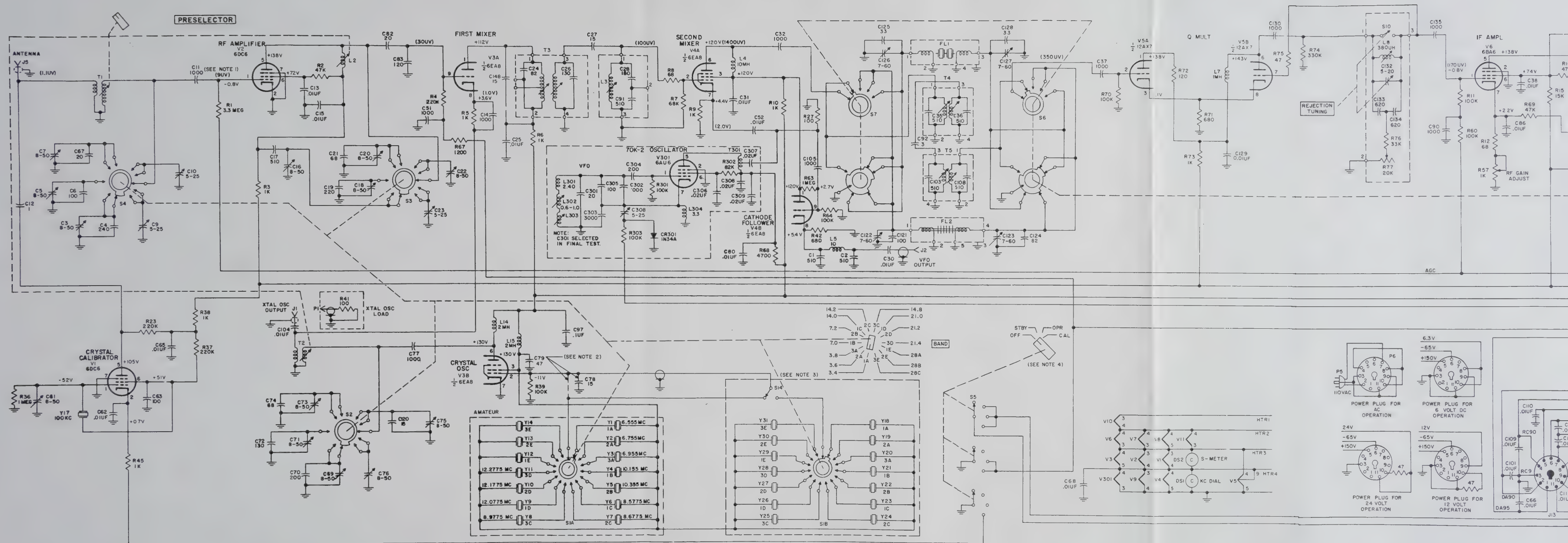






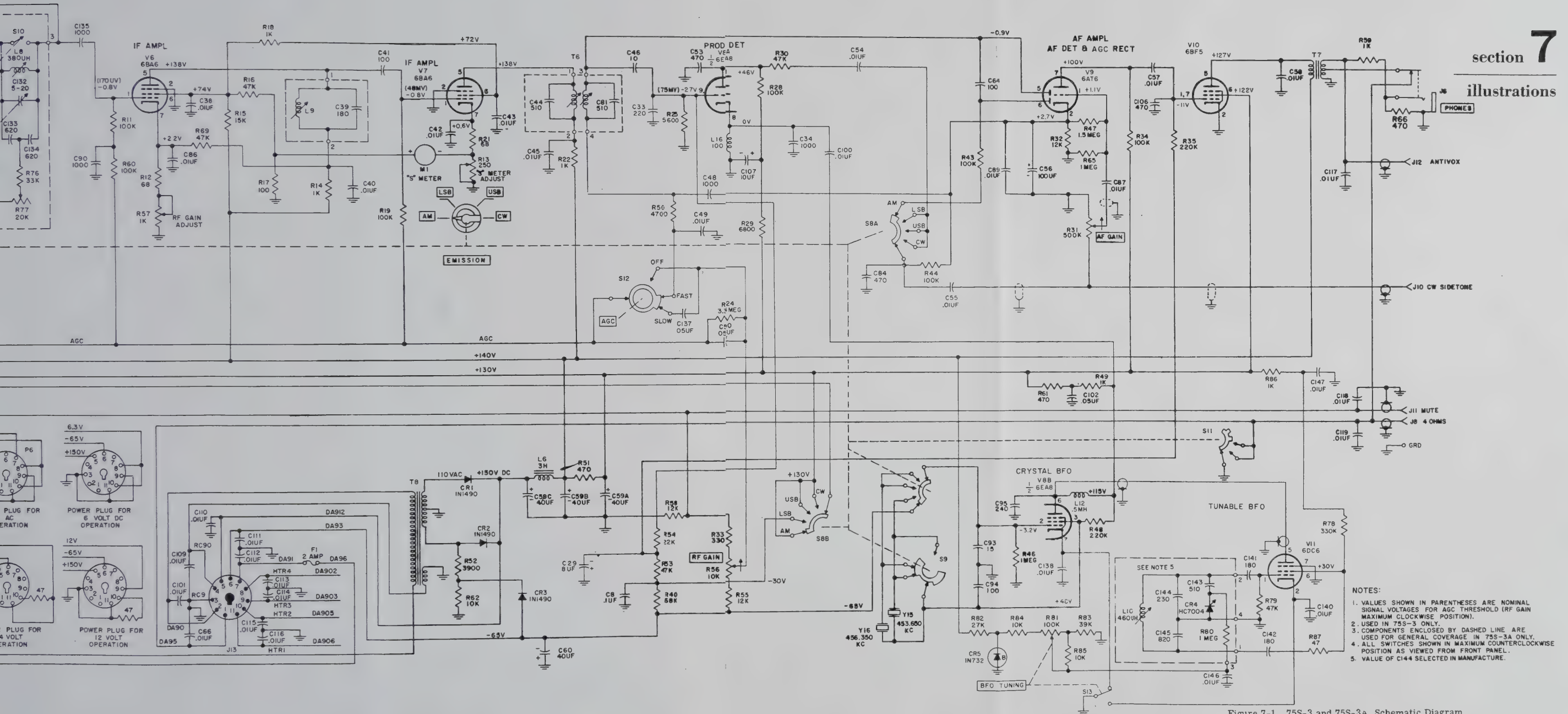






# section 7

## illustrations



- NOTES:
1. VALUES SHOWN IN PARENTHESES ARE NOMINAL SIGNAL VOLTAGES FOR AGC THRESHOLD (RF GAIN MAXIMUM COUNTERCLOCKWISE POSITION).
  2. USED IN 75S-3 ONLY.
  3. COMPONENTS ENCLOSED BY DASHED LINE ARE USED FOR GENERAL COVERAGE IN 75S-3A ONLY.
  4. ALL SWITCHES SHOWN IN MAXIMUM COUNTERCLOCKWISE POSITION AS VIEWED FROM FRONT PANEL.
  5. VALUE OF C144 SELECTED IN MANUFACTURE.

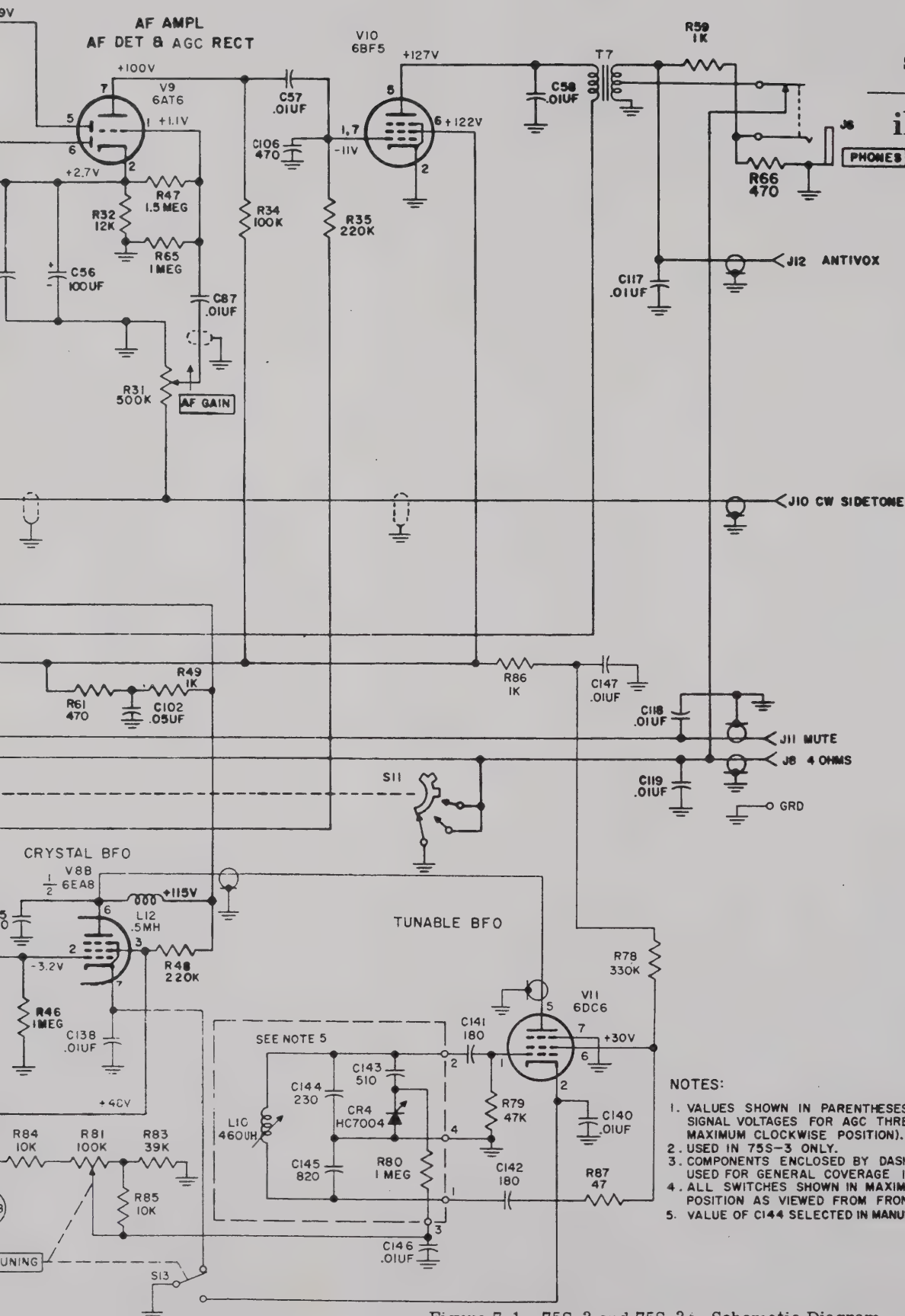
Figure 7-1. 75S-3 and 75S-3A, Schematic Diagram





# section 7

## illustrations



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Figure 7-1. 75S-3 and 75S-3A, Schematic Diagram

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**instruction book**

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**75S - 3 and 75S - 3A**  
**Receivers**

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## **instruction book**

*Cedar Rapids Division | Collins Radio Company, Cedar Rapids, Iowa*

# **75S - 3 and 75S - 3A Receivers**





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### 1.1 Unpacking.

Lift the receiver out of the carton and packing material. Examine for visible damage. If the receiver has been damaged in shipment, save the box and packing material, and notify the transportation company. Complete and mail the equipment registration card. Check tubes and crystals for proper seating in sockets. Check tuning controls and switches for freedom of action. Check that the special Mu-Metal shields are in place on tube V11 and coil L10 (see figure 4-1). Check the equipment included with the receiver against table 1-1.

### 1.2 Cabling.

1.2.1 EXTERNAL CONNECTIONS. Figure 1-1 shows the location of jacks for external connections to 75S-3 and 75S-3A receivers. The power cable plugs into socket J13. The ANT jack is a nominal 50-ohm antenna input. The 4  $\Omega$  AUDIO jack is for connection of a speaker.

### CAUTION

DO NOT connect the a-c power cord to the 115-volt a-c line until power plug P6 has been plugged into J13. To avoid damage to the receiver, make sure the key on P6 is properly aligned with the keyway on J13.

To connect the receiver for mute operation, a means of supplying a ground while receiving must be applied to the MUTE jack. Opening this circuit mutes the receiver. A set of normally closed contacts on a relay which is keyed with the transmitter may be used for this purpose. To use this circuit, the receiver must be operated in the STBY position.

The CW SIDETONE jack is a high-impedance, low-level audio input (0.2 volt rms, typical) to the receiver. Audio from a sidetone oscillator may be applied to this

TABLE 1-1. EQUIPMENT FURNISHED WITH 75S-3/3A

QUANTITY	DESCRIPTION	FUNCTION	PART NUMBER
2	Phono-type connectors	External connections	361-0062-00
1	Fuse, 2-ampere	Spare	264-4070-00
1	Power cord	A-c power	544-3121-00
1	Power plug adapter	A-c power	368-0138-00
1	Instruction book	75S-3/3A instructions	523-0148-00
1	Logbook	Station logging	523-0755-820
1	Cable marker card	Cable identification	280-2946-00
1	No. 4 Bristo wrench	Accessory tool	024-2900-00
1	No. 6 Bristo wrench	Accessory tool	024-9730-00
1	No. 8 Bristo wrench	Accessory tool	024-0019-00
1	No. 10 Bristo wrench	Accessory tool	024-9710-00



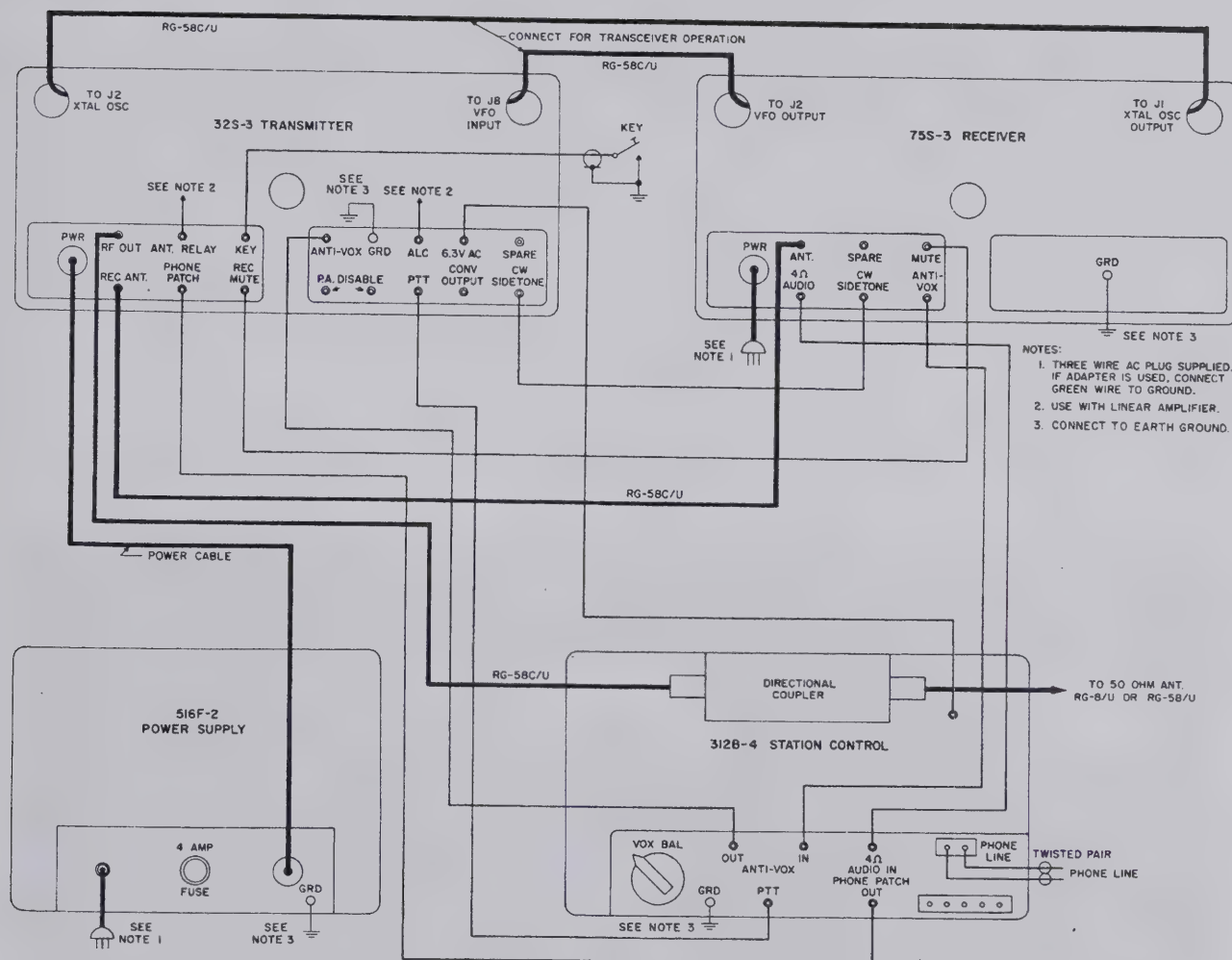


Figure 1-2. Station Interconnections





# section 2

## operation

### 2.1 Calibration.

- After making external connections, set controls as shown in figure 2-1.
- Set BAND switch (11) to desired frequency range. If receiver is 75S-3A, set crystal board selector (10) so desired set of bands appears in window.
- Set dial to 0, 100, or 200 with tuning knob (3).
- Adjust PRESELECTOR (2) for maximum signal or noise output.
- Tune back and forth near 0, 100, or 200 until calibrate signal is at zero beat.
- Adjust zero set knob (4) until dial is calibrated.

### 2.2 Single-Sideband Tuning.

- Set controls as shown in figure 2-1, except set function switch (1) to OPR, and the BFO knob fully counterclockwise until a click is heard.
- Set EMISSION switch (12) to desired sideband.
- Adjust PRESELECTOR (2) for maximum signal or noise output.
- Tune in signal and adjust AF GAIN (9) for desired audio output level.

When listening to strong signals, a reduction in background noise under no-modulation conditions may be

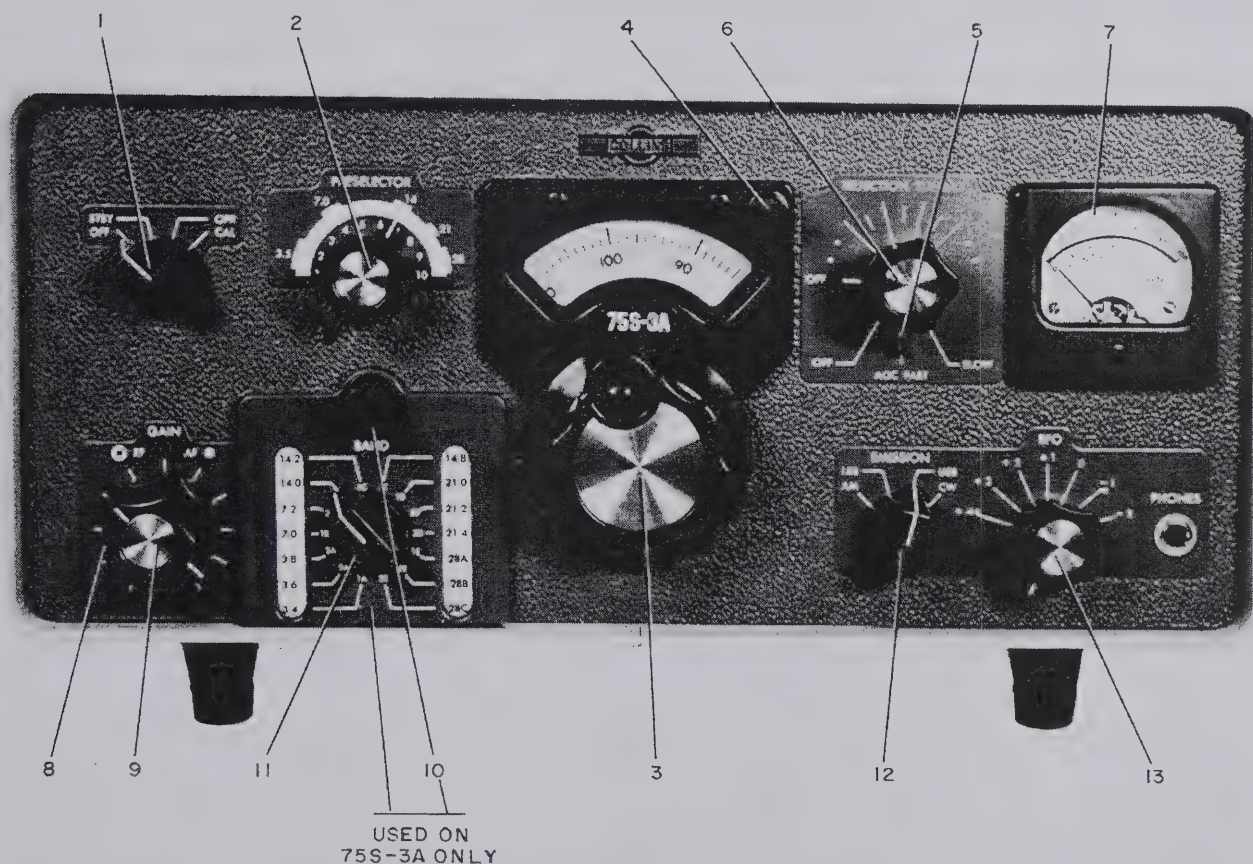


Figure 2-1. Operating Controls





in transceiver operation. Switching the transmitter FREQ CONTROL (1) back to TRANS VFO position will allow separate operation of the two units within the same 200-kc band.

## NOTE

In CW transceiver operation, the 75S variable bfo will have to be used to obtain the desired beat note if it is desired to transmit zero beat with another station.

**CAUTION**

When operating in transceiver service, do not operate the transmitter while the receiver is tuned outside band limits; the transmitted signal will be out of the band. Do not attempt operation with receiver and transmitter set on different 200-kc bands, even when operating in TRANS VFO position. With patch cables connected for transceiver operation, the receiver h-f crystal oscillator controls injection frequency to the transmitter second mixer.

If operation on different 200-kc bands is desired (that is, receive on one 200-kc band and transmit on another), remove the transceiver patch cables and operate the units as in normal independent operation.

If transmitted frequency is changed by any great amount, be sure to redip the PA plate current and check the loading. This will be most important on the 80- and 40-meter bands.

Some operating experience will indicate the amount of frequency excursion possible without readjustment.

Do not attempt operation in transceiver service with any other receiver not having the same frequency mixing scheme.

f. To restore both units to normal operation, remove the two patch cables connecting oscillator signals, replace P1 in J7 on the transmitter slug rack (under top cover), and replace the 100-ohm load plug in the receiver XTAL OSC OUTPUT jack.

**2.9 Operation Outside Amateur Bands.**

Additional 10-meter band coverage, or coverage outside the amateur bands may be obtained by plugging an appropriate crystal into the crystal mounting board. Two extra sockets are provided in the mounting board for this purpose. The total 3.4- to 30.0-megacycle coverage available is divided into five segments, designated A, B, C, D, and E. The frequency range of each of these segments is listed in the total coverage column of table 2-1. The letter portions of the crystal socket locations shown in figure 2-2 indicate which sockets may be used for crystals to cover a 200-kc band within a specific total coverage segment. For example, crystals for extended 10-meter coverage must be plugged into sockets marked E.

The proper crystal for coverage of a specific 200-kc band may be selected as follows:

a. If the lower edge of the desired band is 11.8 mc or less, the required crystal frequency is equal to the

TABLE 2-1. CRYSTAL FREQUENCIES AND OPERATING BANDS

BAND-SWITCH POSITION	FREQUENCY BAND	CRYSTAL SUPPLIED	CRYSTAL SOCKET CONNECTED	TOTAL COVERAGE
1A - 3.4	3.4 - 3.6 mc	6.555 mc	1A	A 3.4 - 5.0 mc
2A - 3.6	3.6 - 3.8 mc	6.755 mc	2A	
3A - 3.8	3.8 - 4.0 mc	6.955 mc	3A	
1B - 7.0	7.0 - 7.2 mc	10.155 mc	1B	B 6.5 - 9.5 mc
2B - 7.2	7.2 - 7.4 mc	10.355 mc	2B	
1C - 14.0	14.0 - 14.2 mc	8.5775 mc	1C	C 9.5 - 15.0 mc
2C - 14.2	14.2 - 14.4 mc	8.6775 mc	2C	
3C - 14.8	14.8 - 15.0 mc	8.9775 mc	3C	
1D - 21.0	21.0 - 21.2 mc	12.0775 mc	1D	D 15.0 - 22.0 mc
2D - 21.2	21.2 - 21.4 mc	12.1775 mc	2D	
3D - 21.4	21.4 - 21.6 mc	12.2775 mc	3D	
1E - 28A	28.5 - 28.7 mc	15.8275 mc	2E	E 22.0 - 30.0 mc
2E - 28B	As selected	Not supplied	2E	
3E - 28C	As selected	Not supplied	3E	



## principles of operation

### 3.1 Block Diagram.

Figure 3-1 is a block diagram for 75S-3 and 75S-3A Receivers. Double conversion is used, with injection voltage for the first conversion provided by a crystal-controlled oscillator. A band-pass i-f, 200 kilocycles wide, is used to couple the first and second mixers. Injection voltage for the second mixer is furnished by a vfo with a tuning range of 200 kc. The 455-kc output frequency of the second mixer is coupled through the i-f system to separate AM and SSB detectors. Injection voltage for the product detector is provided by either a crystal-controlled bfo or a tunable bfo. The 75S-3A is identical to the 75S-3 except that it is equipped with an extra h-f crystal mounting board on the chassis, a crystal board selector switch on the front panel, and associated components. Figure 7-1 is a schematic diagram for both receivers, with circuit differences noted.

### 3.2 R-F and Mixer Circuits.

The r-f amplifier grid, high-frequency mixer grid, and crystal oscillator plate circuits are resonated by slug-tuned coils. The slugs are mechanically ganged and linked to the PRESELECTOR tuning knob. The required tuning ranges of these circuits are obtained by switching appropriate values of fixed capacitance in parallel with the coils. The total 3.4- to 30-mc tuning range of the receiver is divided into five segments for band-switching purposes, as noted in table 2-1. The tuned circuit LC ratio is thereby varied within appropriate limits for each of the five segments.

Signals within the particular 200-kc band selected are amplified by V2, the r-f amplifier, and coupled to the control grid of V3A, the first mixer. Injection voltage is coupled to the cathode of V3A. Products of mixing are selected in the plate circuit of V3A, tuned to 3.155 to 2.955 mc which is the band-pass i-f frequency. Signals are coupled to the control grid of second mixer V4A with vfo injection voltage applied to the cathode of this tube.

### 3.3 Oscillator Circuits.

**3.3.1 CRYSTAL OSCILLATORS.** High-frequency crystal oscillator V3B provides injection voltage for the first mixer. The crystal oscillator output frequency is always 3.155 mc higher than the lower edge of the selected band. On bands below 12.0 mc, the oscillator plate circuit is tuned to the crystal frequency. At 12.0 mc and higher, the plate circuit is tuned to the second harmonic. The secondary winding of T2 couples injection voltage to the first mixer cathode circuit and furnishes a d-c return

to ground for mixer tube V3A. Dummy load R41 stimulates the load presented by the 32S-3 Transmitter when connected for transceiver operation.

Crystal-controlled bfo V8B and associated circuitry furnishes injection voltage for the product detector. Crystals Y15 and Y16 provide the proper bfo frequency relationships to the mechanical filter passband to yield optimum audio response from the product detector. Crystal Y15 is used for lower sideband reception, and Y16 is used for upper sideband. Capacitor C95 and coil L-12 form a broadly resonant circuit at 455 kc. Oscillator voltage is developed across R49 and coupled by C100 to the cathode of V8A, the product detector tube.

The crystal calibrator circuit provides marker signals at multiples of 100 kc. Variable capacitor C61 provides for adjustment to zero beat with WWV. The output of this oscillator is coupled to the receiver antenna circuits.

**3.3.2 VARIABLE OSCILLATORS.** The vfo uses fixed capacitance and variable inductance to produce the required tuning range of 2.5 to 2.7 mc. Capacitor C303, in the frequency-determining network, is paralleled by variable capacitor C308 in series with diode CR301. This diode switches C308 in or out of the circuit, depending upon the polarity of a bias voltage impressed across the diode junction. The bias voltage is coupled to the diode through R303, and is positive in the USB position causing CR301 to switch C308 into the circuit. When C308 is properly adjusted, it shifts the vfo frequency by an amount equal to the frequency separation of crystals Y15 and Y16. This allows either sideband to be selected without retuning or recalibrating the dial. The vfo output voltage is coupled to the cathode of second mixer tube V4A and to the control grid of cathode follower V4B. The cathode follower prevents loading of the vfo circuits by cable capacity when operated in transceiver service.

Tube V11 and associated circuitry comprise a tunable bfo. The bfo tuning control is potentiometer R81. This control varies a positive d-c voltage applied to the junction of voltage-variable capacitor CR4. The junction capacity of this device is proportional to applied voltage. Adjustment of R81 therefore varies the output frequency of the bfo. Voltage for the tuning circuit is stabilized by a regulator consisting of Zener diode CR5 and resistor R82. Switch S13 completes the cathode circuit of either V8B or V11 thus turning on the desired bfo





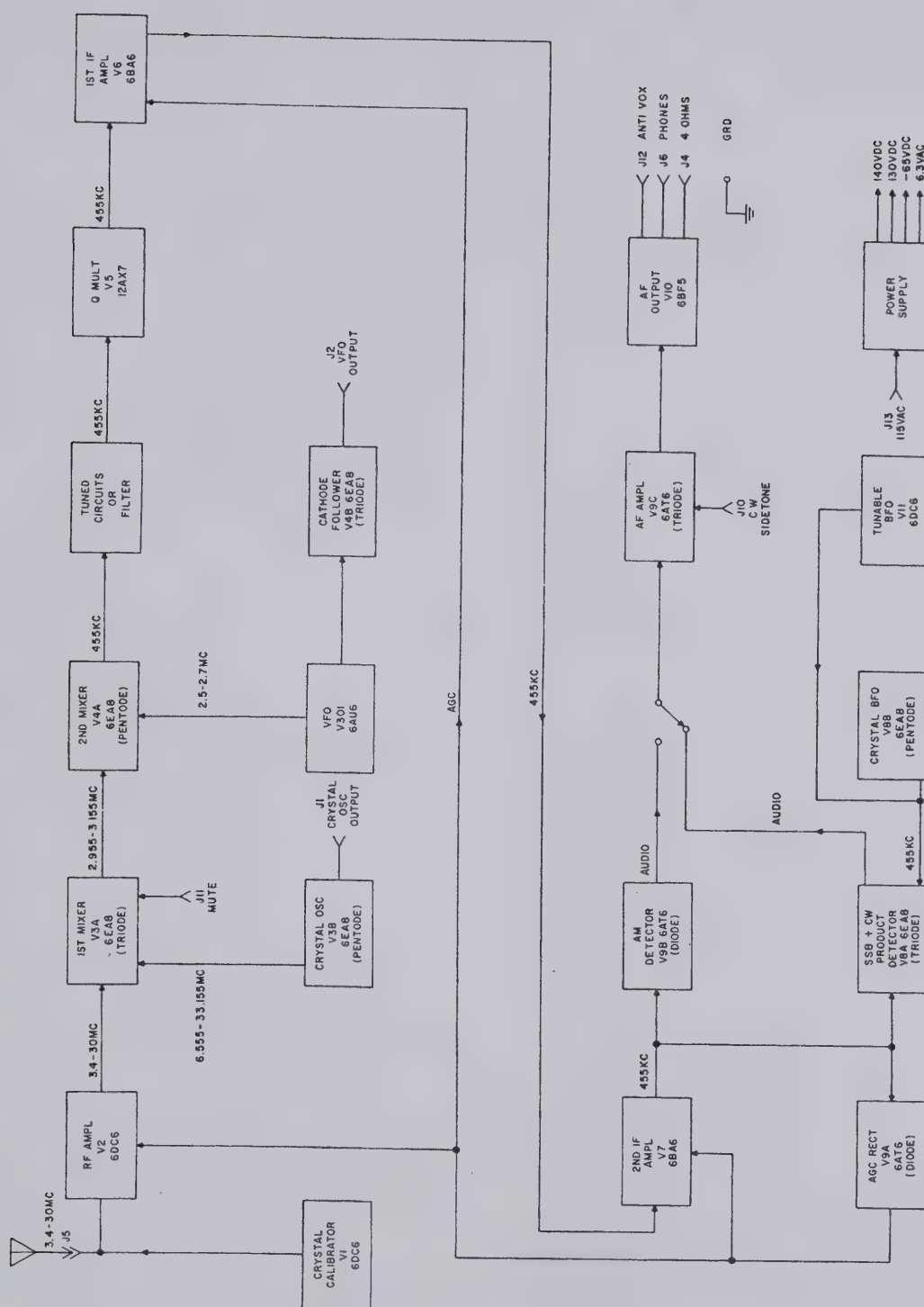


Figure 3-1. Block Diagram





### 4.1 General.

This section covers maintenance and service of 75S-3 and 75S-3A Receivers. It includes information on trouble analysis, signal tracing procedures, voltage and resistance measurements, and alignment procedures. The usefulness of signal level and alignment data given depends upon the accuracy of the test equipment used. Minor adjustments in alignment may be made using the crystal calibrator as a signal source. Except for an occasional touch-up to compensate for possible component aging, alignment normally will be necessary only if frequency-determining components have been replaced. If servicing requires that the cabinet be removed, proceed as follows:

- a. Disconnect all power and external connections.
- b. Lift the lid, and remove the two screws located at the front edge of the cabinet.
- c. Remove the four feet and the screw located midway between the rear feet.
- d. From the rear, push the receiver chassis forward until the front panel protrudes from the cabinet about an inch.
- e. Grasping the front panel at the edges, slide the receiver out of the cabinet.

#### NOTE

DO NOT lubricate the 70K-2 vfo shaft bearings or the dial drive system bearings. The vfo shaft bearings are lubricated at the factory with a special grease. Dial bearings are the Oilite type which are self-lubricating.

Tube filaments and pilot lamps are connected in series-parallel arrangements for 12- or 24-volt operation. When making tube or lamp replacements, be sure that rated filament currents are the same as the original units.

### 4.2 Trouble Analysis.

Most cases of trouble can be traced to defective tubes. Many tube checkers can not duplicate the conditions under which the tubes work in the receiver. Substitution of new tubes will sometimes clear an obscure case of tube trouble. Intermittent trouble conditions in tubes can usually be discovered by lightly tapping the envelope. Occasionally, tube pins or socket terminals will become dirty or

corroded causing an intermittent condition. When this situation is suspected, remove the tube and apply a few drops of contact cleaner to the tube pins. Replace the tube, and work it up and down in the socket a few times. Shorted tubes or capacitors will often cause associated resistors to overheat and crack, blister, or discolor. Making the measurements listed in table 4-1 will help to isolate this type of trouble to a particular stage or component.

A logical process of elimination in conjunction with a study of the main schematic diagram, block diagram, and section 3 will aid in isolating trouble. For example, if the receiver functions properly in the AM position but fails to operate in the SSB or CW positions, trouble in the product detector should be suspected because this circuit is not used for AM reception. As a further check, both beat-frequency oscillators should be alternately switched into the circuit to see if one has failed. A third possibility would be that both beat oscillators have failed.

If the receiver is to be returned to the factory or an authorized service agency, a detailed report of operational difficulties will assist the servicing agency in making repairs with a minimum of time and expense. This is particularly important when intermittent trouble is involved.

### 4.3 Voltage And Resistance Measurements.

Table 4-1 lists typical voltage and resistance readings at each tube socket terminal except those of the vfo tube, V301. Do not open the vfo can. Make all measurements under the following conditions:

- a. Unless otherwise noted in the table, set RF GAIN at maximum, AF GAIN at minimum, EMISSION switch in USB position, function switch in OPR position, tunable bfo off, REJECTION TUNING OFF, and AGC in the FAST position.
- b. Voltage measurements are made with power connected.
- c. Resistance measurements are made with all external cables, including power cable, disconnected. Resistances of less than one ohm are listed as zero.
- d. Make all measurements from indicated socket terminal to chassis ground.

It is recommended that a vtvm be used for these measurements. A vom may be used if it has an input resistance of not less than 20,000 ohms per volt. Voltage measurements made with a vom will yield lower readings in high impedance circuits such as the agc line. Do not use a vom for r-f measurements.



TABLE 4-2. SIGNAL LEVELS

SIGNAL INJECTION POINT	GENERATOR OUTPUT FREQUENCY	GENERATOR OUTPUT VOLTAGE	NORMAL INDICATION
V10 - pin 1	1000 cps	5.4 volts	1-watt audio output
V9 - pin 1	1000 cps	0.2 volt	1-watt audio output
V8 - pin 9	455 kc	75 millivolts	1-watt audio output
V8 - pin 6	BFO INJECTION		1.65 volts r-f (each bfo)
V7 - pin 1	455 kc	48 millivolts	Agc threshold
V6 - pin 1	455 kc	175 microvolts	Agc threshold
V4 - pin 6	455 kc	1400 microvolts	Agc threshold
V4 - pin 7	VFO INJECTION		2.0-2.5 r-f volts
V4 - pin 2	3.055 mc	100 microvolts	Agc threshold
V3 - pin 8	HF OSC INJECTION		0.8-2.0 r-f volts
V3 - pin 9	14.1 mc	30 microvolts	Agc threshold
V2 - pin 1	14.1 mc	9 microvolts	Agc threshold
J5 (ANT)	14.1 mc	1.5 microvolts	Agc threshold

#### 4.4 Signal Tracing.

Appropriate test points and normal signal levels are listed in table 4-2. The values listed are nominal. Signal levels in a given receiver may differ from those listed by a factor of plus or minus 20 percent without noticeable degradation in performance. A signal generator with an accurately calibrated output attenuator must be used to provide the r-f signal source voltages indicated. A Hewlett-Packard model 606A or equivalent generator is recommended for this purpose. Be sure to consult the signal generator instruction book for information regarding output termination requirements. Measurements of oscillator injection voltages require the use of an r-f vtm such as the Hewlett-Packard model 410B. Make r-f and audio measurements under the following conditions:

- For audio measurements, use an audio oscillator as the signal source and an a-c vtm or calibrated oscilloscope to monitor receiver audio output. If desired, an audio wattmeter may be used. Set AF GAIN at maximum, and terminate the 4 $\Omega$  AUDIO output with a four-ohm resistive load.
- Oscillator injection voltages are measured with an r-f vtm. Measure from cathode to chassis ground at the associated mixer or product detector tube.

- To check r-f signal levels, connect a d-c vtm to the receiver agc line. Set RF GAIN at maximum. Static d-c voltage on the agc line should be approximately -1.0 volt. Connect the r-f signal generator to the point indicated in the table, and rock the generator dial to produce maximum agc voltage. Starting from minimum output, increase signal generator output to the point where a further increase in signal produces a slight increase in agc voltage. This is agc threshold. Note generator output voltage, and compare with the value listed in the table.

#### 4.5 Alignment Procedure.

Complete alignment of the receiver may be accomplished using the crystal calibrator as a signal source and the S-meter as a peak indicator. To provide a variable output attenuator for the calibrator, connect a .001-uf capacitor to one end of a 5000-ohm carbon potentiometer. Temporarily connect the free end of the capacitor to tube socket terminal 5 of V1, the crystal calibrator. Connect the rotating contact of the potentiometer to ground. Figure 4-1 shows the location of adjustments except for the filter input and output trimmer capacitors. These trimmers are located under the chassis adjacent to the mechanical and crystal filters. The





- c. Connect one swamping network from T3 primary (terminal 1) to ground and the other from L3 (terminal 1) to ground.
- d. Adjust attenuator to provide meter reading of approximately S-3.
- e. Peak the secondary of T3 (top of can) using a Walsco 2543 or equivalent type tuning tool.
- f. Remove both swamping networks and swamp T3 secondary (terminal 3 to ground). Peak T3 primary (bottom of can), and peak L3.
- g. Remove swamping network from T3 secondary. This completes band-pass i-f alignment.
- h. If a signal generator is used for this alignment, disable the h-f crystal oscillator by removing the crystal for the 3.6-mc band. Connect the signal generator to the XTAL OSC OUTPUT jack, and set to 3.055 mc. Tune receiver to the generator signal at approximately 100 on the dial. Align as above, disconnect generator, and replace crystal.

#### 4.5.3 R-F CIRCUIT ALIGNMENT.

- a. Tune to the calibrate signal at 3.7 mc with the EMISSION switch in either USB or LSB position. Connect a 47-ohm resistor or a dummy load such as the DL-1 to the 75S-3/3A ANT jack. During the following procedures, adjust the calibrator output attenuator as necessary to maintain a meter reading of approximately S-3.
- b. Set both A (3.8) RF and ANT trimmer capacitors so the large notches point to approximately 2 o'clock when viewed as shown in figure 4-1. Set the A (3.8) OSC trimmer so the large notch points to the rear of the chassis.
- c. Set the PRESELECTOR to 2.1 on the logging scale.
- d. Adjust the OSC, RF, and ANT slugs located on the movable platform the maximum S-meter indication. Adjust the OSC slug first. After making these adjustments, make sure the PRESELECTOR tuning peaks at 2.1 on the logging scale.
- e. Set BAND switch to 28A, PRESELECTOR to 8.9 on the logging scale, and tune to the calibrate signal at 28.6 mc. Maintain S-3 signal level.
- f. Adjust E (28) OSC, RF, and ANT trimmer capacitors for peak S-meter reading. Adjust OSC trimmer first.
- g. Set BAND switch to 21.0 and PRESELECTOR to 7.9 on the logging scale. Tune to calibrate signal at 21.1 mc. Maintain S-3 signal level.
- h. Adjust D (21) OSC, RF, and ANT trimmers for peak S-meter reading. Adjust OSC trimmers first.
- i. Set BAND switch to 14.8 and PRESELECTOR to 7.0 on the logging scale. Tune to calibrate signal at 14.9 mc. Maintain S-3 signal level.
- j. Adjust C (14) OSC trimmer for peak S-meter reading.
- k. Set BAND switch to 14.2 and PRESELECTOR to 6.6 on the logging scale.
- l. Adjust C (14) RF and ANT trimmers for peak meter reading. Maintain S-3 signal level.

- m. Set BAND switch to 7.0 and PRESELECTOR to 3.9 on the logging scale. Tune to calibrate signal at 7.1 mc. Maintain S-3 signal level.
- n. Adjust B OSC, RF, and ANT trimmers for peak S-meter reading. Adjust OSC trimmer first.
- o. Disconnect the crystal calibrator output attenuator. This completes r-f alignment.
- p. If signal generator and r-f vtm are used for this alignment, connect the generator output to the receiver ANT jack. Set generator output to frequencies listed, and align RF and ANT trimmers as outlined in preceding steps. Connect r-f vtm to XTAL OSC OUTPUT jack on bottom side of chassis, leaving load plug P1 in place. Align OSC trimmers as indicated except adjust for peak reading on the vtm. In step k, adjust PRESELECTOR near 6.6 on logging scale at the point where vtm reading peaks.

#### 4.5.4 VFO SIDEBAND FREQUENCY SHIFT ADJUSTMENT.

Set EMISSION switch to LSB, and tune to zero beat with calibrate signal at 3.7 mc. Without further movement of the dial, switch to USB, and adjust C308 (on vfo) for zero beat.

#### 4.5.5 CRYSTAL CALIBRATOR ADJUSTMENT.

- a. Set receiver for AM reception, and tune to WWV at 15.0-mc at a time when the station is not transmitting tone.
- b. Turn function switch to CAL position. Set 100 KC ADJUST trimmer C61 for zero beat of the calibrate signal against WWV.

#### 4.5.6 VFO DIAL CALIBRATION.

Calibrate the dial at 100. If zero beat with the calibrate signal does not occur at 0 and 200  $\pm$  1 kc on the dial, there is end-point spread. If there is no end-point spread, but the hairline is not vertical when the dial is calibrated, a mechanical adjustment only is required. Refer to step h in the following procedure. To correct for end-point spread, make the following adjustments:

- a. Set BAND switch to any band and function switch to CAL, and tune calibrate signal to zero beat at 200 end of the dial.
- b. Set hairline to 200 with zero set knob.
- c. Tune calibrate signal to zero beat at 0 end of the dial. Note the difference in kilocycles between the hairline and dial 0 (example: -1.5 kc).
- d. Without moving the hairline, move the dial to the opposite side of 0 by an amount equal to the frequency difference noted above (example: +1.5 kc).
- e. Adjust L302 for zero beat. It is located on top of the vfo can.
- f. Set the hairline at 0 with zero set knob.
- g. Tune the calibrate signal to zero beat at the 200-end of the dial. If zero beat does not occur at exactly 200, repeat steps b through e.





#### 4.6 Installation of Optional Filters.

Space is provided in the 75S-3/3A to install accessory filters in place of the 455-kc transformers used in the AM function. Figure 4-2 shows the placement of parts and required wiring changes.

To obtain access to the front trimmer-mounting strip, remove the long strip located behind the front panel and fastened by machine screws to the brackets for the front cabinet feet. Bend the mounting tabs on the new trimmer capacitors slightly toward each other, snap the trimmers into place on the trimmer-mounting strips, and solder the appropriate lugs to the ground buses as shown in figure 4-2. Install the filter as shown. If necessary, bend the new filter

clamp slightly to provide a good fit around the filter. One end of the filter has three terminals, one of which has no insulation around it. This is the case ground. Connect this terminal and either one of the two remaining terminals to chassis ground. Either of the terminals on the opposite end of the filter may be used for the ground connection indicated. Dress the new wiring carefully to prevent shorts. Where needed, use spaghetti from removed wiring.

When installation and wiring are completed, turn the receiver on, and tune to the calibrate signal at 14.0 mc. Adjust the filter trimmer capacitors for maximum S-meter reading with the signal centered in the filter passband. Available filters and installation kit of parts are listed in table 5-2.



### 5.3 Tube, Fuse, Lamp, And Semiconductor Complement.

TABLE 5-1. TUBES, FUSES, LAMPS, AND SEMICONDUCTORS

SYMBOL	FUNCTION	TYPE	SYMBOL	FUNCTION	TYPE
V1	Crystal calibrator	6DC6	V9	AM detector, agc rectifier, audio amplifier	6AT6
V2	R-f amplifier	6DC6			
V3A	First mixer	6EA8	V10	Audio output	6BF5
V3B	Crystal oscillator	6EA8	V11	Tunable BFO	6DC6
V4A	Second mixer	6EA8	V301	VFO	6AU6
V4B	Cathode follower	6EA8	CR1, CR2	Power rectifiers	1N1490
V5	Q-multiplier	12AX7	CR3	Bias rectifier	1N1490
V6	First i-f amplifier	6BA6	CR4	BFO tuning	HC7004
V7	Second i-f amplifier	6BA6	CR5	Voltage regulator	1N732
V8A	Product detector	6EA8	CR301	Switch	1N34A
V8B	Crystal BFO	6EA8	DS1, DS2	Dial lamps	47
			F1	Power supply fuse	2 amp

### 5.4 Available Accessories.

TABLE 5-2. AVAILABLE ACCESSORIES

ITEM	FUNCTION	COLLINS PART NUMBER
312B-3 Speaker	Station speaker	522-1166-00
312B-4 Station Control	Speaker, phone patch, directional wattmeter, and station control switches.	522-1167-00
351E-1 Mounting Plate	Table mount for 75S-3/3A.	522-1479-00
351E-2 Mounting Plate	Table mount for 312B-4.	522-1480-00
351E-3 Mounting Plate	Table mount for 312B-3.	522-1481-00
351R-1 Rack Mount	Rack mount for 75S-3/3A.	522-2665-00
351R-2 Rack Mount	Rack mount for 312B-4.	522-2666-00
Extra crystals	Additional band coverage.	See Parts List.
F455Y-31 Filter	3.1-kc band-pass filter.	526-9338-00
F455Y-40 Filter	4.0-kc band-pass filter.	526-9339-00
F455Y-60 Filter	6.0-kc band-pass filter.	526-9340-00
Filter Installation Kit	Parts for filter installation.	549-5095-00



## specifications

### 5.1 Frequency Coverage.

Both the 75S-3 and the 75S-3A Receivers are capable of receiving on any frequency within the range of 3.4 to 30.0 mc. Receiver coverage is in increments of 200 kc for each bandswitch setting. The 75S-3 is equipped with 14 crystal sockets, selectable from the front panel. The 75S-3A is equipped with 28 crystal

sockets, selectable from the front panel. With the 12 crystals furnished, both receivers provide complete coverage of 80 meters, 40 meters, 20 meters, 15 meters, WWV at 15 mc, and the 28.5- to 28.7-mc portion of the 10-meter band. Remaining crystal sockets may be used for additional 10-meter coverage. Other crystals may be substituted for those furnished to provide coverage at other frequencies throughout the range.

### 5.2 Equipment Characteristics.

Power requirements. . . . .	115 volts, 50 to 60 cps. Power consumption is approximately 90 watts. Power may be provided by an external supply which delivers 150 volts d-c at 125 ma and -70 volts d-c at 5 ma. Filament power may be a-c or d-c as follows: 6 to 7 volts at 5.5 amperes, 12 to 14 volts at 2.75 amperes, or 24 to 28 volts at 1.375 amperes.
Frequency range. . . . .	3.4 to 30.0 megacycles. With crystals furnished, bands are as follows: 3.4 to 3.6 mc, 3.6 to 3.8 mc, 3.8 to 4.0 mc, 7.0 to 7.2 mc, 7.2 to 7.4 mc, 14.0 to 14.2 mc, 14.2 to 14.4 mc, 14.8 to 15.0 mc, 21.0 to 21.2 mc, 21.2 to 21.4 mc, 21.4 to 21.6 mc, and 28.5 to 28.7 mc.
Mode . . . . .	Selectable single sideband, CW, or AM.
Sensitivity . . . . .	0.5 microvolt for 10-db signal-plus-noise to noise ratio in SSB mode.
Selectivity . . . . .	SSB: 2.1 kc at 6 db down, 4.2 kc at 60 db down. CW: 0.2 kc at 6 db down, 1.25 kc at 60 db down. AM: 4.5 kc at 6 db down, 25 kc at 60 db down.
Spurious response . . . . .	Image rejection better than 50 db. Internal spurious signals below one microvolt equivalent antenna input.
Frequency stability . . . . .	Within 100 cps after warmup.
Dial accuracy . . . . .	Better than one kc on any band after midband calibration.
S-meter calibration. . . . .	Approximately S-9 with 100-uv antenna input signal.
Audio output requirements. . . . .	Speaker: 3 to 4 ohms. Headphones: 500 ohms or higher.
Audio output level. . . . .	0.25 watt at agc threshold. 1.8 watts maximum.
Size. . . . .	7-3/4 in. high, 14-3/4 in. wide, 12-1/2 in. deep.
Weight. . . . .	20 pounds.

### 5.1 Frequency Coverage.

Both the 75S-3 and the 75S-3A Receivers are capable of receiving on any frequency within the range of 3.4 to 30.0 mc. Receiver coverage is in increments of 200 kc for each bandswitch setting. The 75S-3 is equipped with 14 crystal sockets, selectable from the front panel. The 75S-3A is equipped with 28 crystal

sockets, selectable from the front panel. With the 12 crystals furnished, both receivers provide complete coverage of 80 meters, 40 meters, 20 meters, 15 meters, WWV at 15 mc, and the 28.5- to 28.7-mc portion of the 10-meter band. Remaining crystal sockets may be used for additional 10-meter coverage. Other crystals may be substituted for those furnished to provide coverage at other frequencies throughout the range.

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Frequency range. . . . .	3.4 to 30.0 megacycles. With crystals furnished, bands are as follows: 3.4 to 3.6 mc, 3.6 to 3.8 mc, 3.8 to 4.0 mc, 7.0 to 7.2 mc, 7.2 to 7.4 mc, 14.0 to 14.2 mc, 14.2 to 14.4 mc, 14.8 to 15.0 mc, 21.0 to 21.2 mc, 21.2 to 21.4 mc, 21.4 to 21.6 mc, and 28.5 to 28.7 mc.
Mode . . . . .	Selectable single sideband, CW, or AM.
Sensitivity . . . . .	0.5 microvolt for 10-db signal-plus-noise to noise ratio in SSB mode.
Selectivity . . . . .	SSB: 2.1 kc at 6 db down, 4.2 kc at 60 db down. CW: 0.2 kc at 6 db down, 1.25 kc at 60 db down. AM: 4.5 kc at 6 db down, 25 kc at 60 db down.
Spurious response . . . . .	Image rejection better than 50 db. Internal spurious signals below one microvolt equivalent antenna input.
Frequency stability . . . . .	Within 100 cps after warmup.
Dial accuracy. . . . .	Better than one kc on any band after midband calibration.
S-meter calibration. . . . .	Approximately S-9 with 100-uv antenna input signal.
Audio output requirements. . . . .	Speaker: 3 to 4 ohms. Headphones: 500 ohms or higher.
Audio output level. . . . .	0.25 watt at agc threshold. 1.8 watts maximum.
Size . . . . .	7-3/4 in. high, 14-3/4 in. wide, 12-1/2 in. deep.
Weight. . . . .	20 pounds.

SECTION 5  
Specifications

5.3 Tube, Fuse, Lamp, And Semiconductor Complement.

TABLE 5-1. TUBES, FUSES, LAMPS, AND SEMICONDUCTORS

SYMBOL	FUNCTION	TYPE	SYMBOL	FUNCTION	TYPE
V1	Crystal calibrator	6DC6	V9	AM detector, agc rectifier, audio amplifier	6AT6
V2	R-f amplifier	6DC6			
V3A	First mixer	6EA8	V10	Audio output	6BF5
V3B	Crystal oscillator	6EA8	V11	Tunable BFO	6DC6
V4A	Second mixer	6EA8	V301	VFO	6AU6
V4B	Cathode follower	6EA8	CR1, CR2	Power rectifiers	1N1490
V5	Q-multiplier	12AX7	CR3	Bias rectifier	1N1490
V6	First i-f amplifier	6BA6	CR4	BFO tuning	HC7004
V7	Second i-f amplifier	6BA6	CR5	Voltage regulator	1N732
V8A	Product detector	6EA8	CR301	Switch	1N34A
V8B	Crystal BFO	6EA8	DS1, DS2	Dial lamps	47
			F1	Power supply fuse	2 amp

5.4 Available Accessories.

TABLE 5-2. AVAILABLE ACCESSORIES

ITEM	FUNCTION	COLLINS PART NUMBER
312B-3 Speaker	Station speaker	522-1166-00
312B-4 Station Control	Speaker, phone patch, directional wattmeter, and station control switches.	522-1167-00
351E-1 Mounting Plate	Table mount for 75S-3/3A.	522-1479-00
351E-2 Mounting Plate	Table mount for 312B-4.	522-1480-00
351E-3 Mounting Plate	Table mount for 312B-3.	522-1481-00
351R-1 Rack Mount	Rack mount for 75S-3/3A.	522-2665-00
351R-2 Rack Mount	Rack mount for 312B-4.	522-2666-00
Extra crystals	Additional band coverage.	See Parts List.
F455Y-31 Filter	3.1-kc band-pass filter.	526-9338-00
F455Y-40 Filter	4.0-kc band-pass filter.	526-9339-00
F455Y-60 Filter	6.0-kc band-pass filter.	526-9340-00
Filter Installation Kit	Parts for filter installation.	549-5095-00



### 5.1 Frequency Coverage.

Both the 75S-3 and the 75S-3A Receivers are capable of receiving on any frequency within the range of 3.4 to 30.0 mc. Receiver coverage is in increments of 200 kc for each bandswitch setting. The 75S-3 is equipped with 14 crystal sockets, selectable from the front panel. The 75S-3A is equipped with 28 crystal

sockets, selectable from the front panel. With the 12 crystals furnished, both receivers provide complete coverage of 80 meters, 40 meters, 20 meters, 15 meters, WWV at 15 mc, and the 28.5- to 28.7-mc portion of the 10-meter band. Remaining crystal sockets may be used for additional 10-meter coverage. Other crystals may be substituted for those furnished to provide coverage at other frequencies throughout the range.

### 5.2 Equipment Characteristics.

Power requirements. . . . .	115 volts, 50 to 60 cps. Power consumption is approximately 90 watts. Power may be provided by an external supply which delivers 150 volts d-c at 125 ma and -70 volts d-c at 5 ma. Filament power may be a-c or d-c as follows: 6 to 7 volts at 5.5 amperes, 12 to 14 volts at 2.75 amperes, or 24 to 28 volts at 1.375 amperes.
Frequency range. . . . .	3.4 to 30.0 megacycles. With crystals furnished, bands are as follows: 3.4 to 3.6 mc, 3.6 to 3.8 mc, 3.8 to 4.0 mc, 7.0 to 7.2 mc, 7.2 to 7.4 mc, 14.0 to 14.2 mc, 14.2 to 14.4 mc, 14.8 to 15.0 mc, 21.0 to 21.2 mc, 21.2 to 21.4 mc, 21.4 to 21.6 mc, and 28.5 to 28.7 mc.
Mode . . . . .	Selectable single sideband, CW, or AM.
Sensitivity . . . . .	0.5 microvolt for 10-db signal-plus-noise to noise ratio in SSB mode.
Selectivity . . . . .	SSB: 2.1 kc at 6 db down, 4.2 kc at 60 db down. CW: 0.2 kc at 6 db down, 1.25 kc at 60 db down. AM: 4.5 kc at 6 db down, 25 kc at 60 db down.
Spurious response . . . . .	Image rejection better than 50 db. Internal spurious signals below one microvolt equivalent antenna input.
Frequency stability . . . . .	Within 100 cps after warmup.
Dial accuracy . . . . .	Better than one kc on any band after midband calibration.
S-meter calibration. . . . .	Approximately S-9 with 100-uv antenna input signal.
Audio output requirements. . . . .	Speaker: 3 to 4 ohms. Headphones: 500 ohms or higher.
Audio output level. . . . .	0.25 watt at age threshold. 1.8 watts maximum.
Size . . . . .	7-3/4 in. high, 14-3/4 in. wide, 12-1/2 in. deep.
Weight. . . . .	20 pounds.

SECTION 5  
Specifications

5.3 Tube, Fuse, Lamp, And Semiconductor Complement.

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V3B	Crystal oscillator	6EA8	V301	VFO	6AU6
V4A	Second mixer	6EA8	CR1, CR2	Power rectifiers	1N1490
V4B	Cathode follower	6EA8	CR3	Bias rectifier	1N1490
V5	Q-multiplier	12AX7	CR4	BFO tuning	HC7004
V6	First i-f amplifier	6BA6	CR5	Voltage regulator	1N732
V7	Second i-f amplifier	6BA6	CR301	Switch	1N34A
V8A	Product detector	6EA8	DS1, DS2	Dial lamps	47
V8B	Crystal BFO	6EA8	F1	Power supply fuse	2 amp

5.4 Available Accessories.

TABLE 5-2. AVAILABLE ACCESSORIES

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351E-1 Mounting Plate	Table mount for 75S-3/3A.	522-1479-00
351E-2 Mounting Plate	Table mount for 312B-4.	522-1480-00
351E-3 Mounting Plate	Table mount for 312B-3.	522-1481-00
351R-1 Rack Mount	Rack mount for 75S-3/3A.	522-2665-00
351R-2 Rack Mount	Rack mount for 312B-4.	522-2666-00
Extra crystals	Additional band coverage.	See Parts List.
F455Y-31 Filter	3.1-kc band-pass filter.	526-9338-00
F455Y-40 Filter	4.0-kc band-pass filter.	526-9339-00
F455Y-60 Filter	6.0-kc band-pass filter.	526-9340-00
Filter Installation Kit	Parts for filter installation.	549-5095-00

# SECTION 6

## Parts List

ITEM	DESCRIPTION	COLLINS PART NUMBER
C97	CAPACITOR, FIXED, CERAMIC: same as C8	913-3152-00
C98	NOT USED	
C99	NOT USED	
C100	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C101	CAPACITOR, FIXED, CERAMIC: 10.000 uuf ±20%, 1000 v d-c; Centralab Div. of Globe Union, Inc. part no. DA134-048CB	913-3922-00
C102	CAPACITOR, FIXED, CERAMIC: 0.05 uf -80% -20%, 500 v d-c; Sprague Electric part no. 33C58 P O T8	913-3153-00
C103	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C104	CAPACITOR, FIXED, CERAMIC: same as C11	913-3009-00
C105	CAPACITOR, FIXED, MICA: same as C53	912-2865-00
C106	CAPACITOR, FIXED, MICA: same as C53	183-1040-00
C107	CAPACITOR, FIXED, ELECTROLYTIC: 10 uf -10% +100%, 150 v d-c; P. R. Mallory and Co., Inc. part no. TC42	
C108	P O T8	
C109	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C110	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C111	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C112	CAPACITOR, FIXED, CERAMIC: same as C101	913-3922-00
C113	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C114	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C115	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C116	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C117	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C118	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C119	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C120	CAPACITOR, FIXED, MICA: same as C27	912-2760-00
C121	CAPACITOR, FIXED, MICA: same as C41	912-2817-00
C122	CAPACITOR ASSEMBLY, VARIABLE. MICA: 7 uuf min, 60 uuf max, 350 v d-c; Electro Motive part no. T50410, capacitor: T16328, bracket (includes C126, C127)	918-0058-00
C123	CAPACITOR ASSEMBLY: same as C122	918-0058-00
C124	CAPACITOR, FIXED, MICA: 82 uuf ±10%, 500 v d-c; Electro Motive part no. DM15E820K500WV	912-2811-00
C125	CAPACITOR, FIXED, MICA: 33 uuf ±10%, 500 v d-c; Electro Motive part no. DM15E330K500WV	912-2781-00
C126	P O C122	
C127	P O C122	
C128	CAPACITOR, FIXED, MICA: 33 uuf ±10%, 500 v d-c; Electro Motive part no. DM15E560K500WV	912-2799-00
C129	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C130	CAPACITOR, FIXED, CERAMIC: same as C11	913-3009-00
C131	CAPACITOR, FIXED, MICA: same as C128	912-2799-00
C132	P O Q Multiplier	
C133	P O Q Multiplier	
C134	P O Q Multiplier	
C135	CAPACITOR, FIXED, CERAMIC: same as C11	913-3009-00
C136	NOT USED	
C137	CAPACITOR, FIXED, PAPER: same as C50	931-0163-00
C138	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C139	NOT USED	
C140	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C141	CAPACITOR, FIXED, MICA: 180 uuf ±10%, 500 v d-c; Electro Motive part no. DM15F181K500WV	912-2835-00
C142	CAPACITOR, FIXED, MICA: same as C141	912-2835-00
C143	P O BFO (L10)	
C144	P O BFO (L10)	
C145	P O BFO (L10)	
C146	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C147	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C148	CAPACITOR, FIXED, MICA: same as C27	912-2760-00
CR1	SEMICONDUCTOR DEVICE, DIODE: silicon, axial lead mtd; metal and glass case, hermetically sealed; 400 v peak inverse voltage, General Electric part no. 1N1490	353-1659-00
CR2	SEMICONDUCTOR DEVICE, DIODE: same as CR1	353-1659-00
CR3	SEMICONDUCTOR DEVICE, DIODE: same as CR1	353-1659-00
CR4	P O BFO Assembly (L10)	
CR5	SEMICONDUCTOR DEVICE, DIODE: silicon, hermetically sealed; Hughes Aircraft	353-2762-00
DS1	LAMP, INCANDESCENT: 6.3 v, 0.15 amp, 1-1 8 in. lg, clear; General Electric part no. 47	262-3240-00
F1	FUSE, CARTRIDGE: 2 amp, 250 v d-c; ferrule terminal; Littlefuse Inc. part no. 312002	264-4070-00
FL1	FILTER, BAND PASS: 455.0-kc operating fre- quency, 300-cycle bandwidth; Midland Mfg. Co. part no. M3-0843	293-0843-00
FL2	FILTER, BAND PASS: 455.0-kc operating fre- quency, 454.30- to 455.70-kc bandwidth	526-9337-00
J1	JACK, TIP: accommodates 1/8 in. plug; ceramic insulation, brass contacts; Cinch Mfg. Corp. part no. 201-11-01-018	360-0088-00

ITEM	DESCRIPTION	COLLINS PART NUMBER
J2	JACK, TIP: same as J1	360-0088-00
J3	NOT USED	
J4	NOT USED	
J5	JACK, TIP: same as J1	360-0088-00
J6	JACK, TELEPHONE: spring leaf contacts, J1-1B contact arrangement; Switchcraft, Inc. part no. 13E	360-0136-00
L1	NOT USED	
L2	NOT USED	
L3	TRANSFORMER AND COIL ASSEMBLY: 3.055-mc frequency, 25/32 in. by 25/32 in. by 2.875 in. overall; Communications Coil part no. X-185-1A and X-185-1B	278-1721-00
L4	COIL, RADIO FREQUENCY: 10,000 uh, 66.5 ohms d-c; resistance, 75 ma current, no. 22 AWG tinned copper leads (includes C28, C91); Delevan part no. 2500-76	240-2564-00
L5	COIL, RADIO FREQUENCY: single layer wound, 10-uh inductance; Jeffers Electronics, Div. of Speer Carbon Co. part no. 10102-32	240-0149-00
L6	REACTOR: 1 coil, 3.0-hy inductance, 0.120-amp current, 100 ohms resistance (includes C39); Chicago Standard Transformer Corp. part no. 11272	668-0020-00
L7	COIL, RADIO FREQUENCY: 1000 uh, 16 ohms d-c resistance, 135 ma current, 700 v rms; Delevan Electronics part no. 2500-28	240-2540-00
L8	TRANSFORMER, INTERMEDIATE FREQUENCY: 455 kc; 1-1/4 in. by 1-19/64 in. by 4-3/8 in.; Communications Coil Co. part no. X-565-1	278-0653-00
L9	TRANSFORMER, INTERMEDIATE FREQUENCY: 455 kc; 25/32 in. by 25/32 in. by 3 in. over-all dimensions; Communications Coil Co. part no. X-004-2	278-0277-00
L10	TRANSFORMER, RADIO FREQUENCY: 200 turns litz wire, 1/4 pi wound, 25/32 in. by 25/32 in. by 3 in. overall (includes C143, C144, C145, CR4 and R80); Communications Coil Co. part no. X-453-1	278-0655-00
L11	NOT USED	
L12	COIL, RADIO FREQUENCY: 500 uh, 11 ohms d-c resistance, 170 ma current, 700 v rms; Delevan Electronics part no. 2500-14	240-2533-00
L13	NOT USED	
L14	COIL, RADIO FREQUENCY: 3 pi wound, 225 turns ea, 2.0 mh, no. 40 AWG; Delevan Electronics part no. BS-123	240-0084-00
L15	COIL, RADIO FREQUENCY: same as L14	240-0084-00
L16	COIL, RADIO FREQUENCY: 100 uh, 3.2 ohms d-c resistance, 530 ma current, 700 v rms; Jeffers Electronics Div. of Speer Carbon Co. part no. 10404-34	240-0193-00
M1	VOLTMETER: panel, d-c; meter range 0-1 ma, 0-250 v, 50 scale divisions; Simpson Electric type 127B	458-0044-00
P1	DUMMY LOAD, ELECTRICAL: 100 ohms im- pedance, 1 2 w; 1 2 in. dia by 1.139 in. lg overall; (includes R41)	544-3143-002
P2 thru P4	NOT USED	
P5	CABLE ASSEMBLY, SPECIAL PURPOSE, ELEC- TRICAL: 3 conductors no. 18 AWG; 125 v rms working voltage; 0.325 in. dia by 6 ft 0.843 in. lg o a; one end terminated w plug connector; Belden Mfg. Co. KH3491	426-1464-00
P6	POWER CONNECTOR: 11 female contacts (see W1); Amphenol Borg part no. 78-S11M-1005	372-1952-00
R1	RESISTOR, FIXED, COMPOSITION: 3.3 megohms ±10%, 1 2 w; Allen-Bradley, type EB	745-1499-00
R2	RESISTOR, FIXED, COMPOSITION: 47.000 ohms ±10%, 1 2 w; Allen-Bradley type EB	745-1422-00
R3	RESISTOR, FIXED, COMPOSITION: 1000 ohms ±10%, 1 2 w; Allen-Bradley type EB	745-1352-00
R4	RESISTOR, FIXED, COMPOSITION: 0.22 megohm ±10%, 1 2 w; Allen-Bradley type EB	745-1450-00
R5	RESISTOR, FIXED, COMPOSITION: same as R3	745-1352-00
R6	RESISTOR, FIXED, COMPOSITION: same as R3	745-1352-00
R7	RESISTOR, FIXED, COMPOSITION: 68,000 ohms ±10%, 1/2 w; Allen-Bradley type EB	745-1429-00
R8	RESISTOR, FIXED, COMPOSITION: 68,000 ohms ±10%, 1 2 w; Allen-Bradley type EB	745-1303-00
R9	RESISTOR, FIXED, COMPOSITION: same as R3	745-1352-00
R10	RESISTOR, FIXED, COMPOSITION: same as R3	745-1352-00
R11	RESISTOR, FIXED, COMPOSITION: 0.10 megohm ±10%, 1 2 w; Allen-Bradley type EB	745-1436-00
R12	RESISTOR, FIXED, COMPOSITION: same as R8	745-1303-00



# 6

## section

### parts list

ITEM	DESCRIPTION	COLLINS PART NUMBER
	75S-3 RECEIVER	522-2562-00
	75S-3A RECEIVER	522-2664-00
C1	CAPACITOR, FIXED, MICA: 510 uuf $\pm 5\%$ , 300 v d-c; Electro Motive part no. DM15F511J-300WV	912-2867-00
C2	CAPACITOR, FIXED, MICA: same as C1	912-2867-00
C3	CAPACITOR, VARIABLE, CERAMIC: 8 to 75 uuf, 350 v d-c; Erie Resistor Corp. part no. 557018 U2P0 34R	917-1075-00
C4	CAPACITOR, FIXED, MICA: 240 uuf $\pm 5\%$ , 500 v d-c; Electro Motive part no. DM15F241J-500WV	912-2843-00
C5	CAPACITOR, VARIABLE, CERAMIC: same as C3	917-1075-00
C6	CAPACITOR, FIXED, MICA: 100 uuf $\pm 5\%$ , 500 v d-c; Electro Motive part no. DM15F101J-500WV	912-2816-00
C7	CAPACITOR, VARIABLE, CERAMIC: same as C3	917-1075-00
C8	CAPACITOR, FIXED, CERAMIC: 0.1 uf -20% +80%, 500 v d-c; Sprague Electric Co. part no. 41C92	913-3152-00
C9	CAPACITOR, VARIABLE, CERAMIC: 5 to 37.5 uuf, 350 v d-c; Erie Resistor Corp. part no. 557018 C0P0 39R	917-1073-00
C10	CAPACITOR, VARIABLE, CERAMIC: same as C9	917-1073-00
C11	CAPACITOR, FIXED, CERAMIC: 1000 uuf +100% -20%, 500 v d-c; Erie Resistor Corp. part no. 851000 X5U0 102Z	913-3009-00
C12	CAPACITOR, FIXED, CERAMIC: 1.0 uuf $\pm 1/4$ uuf, 500 v d-c; Centralab	916-0070-00
C13	CAPACITOR, FIXED, CERAMIC: 10,000 uuf +100% -20%, 500 v d-c; Sprague of Wisc.	913-3013-00
C14	CAPACITOR, FIXED, CERAMIC: same as C11	913-3009-00
C15	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C16	CAPACITOR, VARIABLE, CERAMIC: same as C3	917-1075-00
C17	CAPACITOR, FIXED, MICA: 510 uuf $\pm 2\%$ , 300 v d-c; Electro Motive part no. DM15F511G300WV	912-2866-00
C18	CAPACITOR, VARIABLE, CERAMIC: same as C3	917-1075-00
C19	CAPACITOR, FIXED, MICA: 220 uuf $\pm 5\%$ , 500 v d-c; Electro Motive part no. DM15F221J500WV	912-2840-00
C20	CAPACITOR, VARIABLE, CERAMIC: same as C3	917-1075-00
C21	CAPACITOR, FIXED, MICA: 68 uuf $\pm 10\%$ , 500 v d-c; Electro Motive part no. DM15E680K500WV	912-2805-00
C22	CAPACITOR, VARIABLE, CERAMIC: same as C3	917-1075-00
C23	CAPACITOR, VARIABLE, CERAMIC: same as C9	917-1073-00
C24	P/O T1	
C25	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C26	P/O T1	
C27	CAPACITOR, FIXED, MICA: 15 uuf $\pm 10\%$ , 500 v d-c; Electro Motive part no. DM15C150K500WV	912-2760-00
C28	P/O L4	
C29	CAPACITOR, FIXED, ELECTROLYTIC: 8 uf -15% +100%, 6 v d-c; Sprague Electric part no. D26717	183-1167-00
C30	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C31	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C32	CAPACITOR, FIXED, CERAMIC: same as C11	913-3009-00
C33	CAPACITOR, FIXED, MICA: 220 uuf $\pm 10\%$ , 500 v d-c; Electro Motive part no. DM15F221K500WV	912-2841-00
C34	CAPACITOR, FIXED, CERAMIC: same as C11	913-3009-00
C35	P/O T7	
C36	P/O T7	
C37	CAPACITOR, FIXED, CERAMIC: same as C11	913-3009-00
C38	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C39	P/O L6	
C40	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C41	CAPACITOR, FIXED, MICA: 100 uuf $\pm 10\%$ , 500 v d-c; Electro Motive part no. DM15F101K500WV	912-2817-00
C42	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C43	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00

ITEM	DESCRIPTION	COLLINS PART NUMBER
C44	P/O T2	
C45	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C46	CAPACITOR, FIXED, MICA: 10 uuf $\pm 10\%$ , 500 v d-c; Electro Motive part no. DM15C100K500WV	912-2754-00
C47	NOT USED	
C48	CAPACITOR, FIXED, CERAMIC: same as C11	913-3009-00
C49	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C50	CAPACITOR, FIXED, PAPER: 0.05 uf +30% -10%, 200 v d-c; Sangamo type 33	931-0163-00
C51	CAPACITOR, FIXED, CERAMIC: same as C11	913-3009-00
C52	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C53	CAPACITOR, FIXED, MICA: 470 uuf $\pm 10\%$ , 300 v d-c; Electro Motive part no. DM15F471K300WV	912-2865-00
C54	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C55	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C56	CAPACITOR, FIXED, ELECTROLYTIC: 100 uf -10% +75%, 6 v d-c; Sprague Electric part no. D28121	183-1782-00
C57	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C58	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C59	CAPACITOR, FIXED, ELECTROLYTIC: 3 sections, 40 uf each, -10% +40%, 150 v d-c; Sprague Electric part no. D27999	183-1701-00
C60	CAPACITOR, FIXED, ELECTROLYTIC: 40 uf -10% +100%, 150 v d-c; P. R. Mallory and Co., Inc. part no. TC48	183-1044-00
C61	CAPACITOR, VARIABLE, CERAMIC: same as C3	917-1075-00
C62	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C63	CAPACITOR, FIXED, MICA: same as C41	912-2817-00
C64	CAPACITOR, FIXED, MICA: same as C41	912-2817-00
C65	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C66	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C67	CAPACITOR, FIXED, MICA: 20 uuf $\pm 10\%$ , 500 v d-c; Electro Motive part no. DM15C200K500WV	912-2766-00
C68	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C69	CAPACITOR, VARIABLE, CERAMIC: same as C3	917-1075-00
C70	CAPACITOR, FIXED, MICA: 200 uuf $\pm 5\%$ , 500 v d-c; Electro Motive part no. DM15F201J500WV	912-2837-00
C71	CAPACITOR, VARIABLE, CERAMIC: same as C3	917-1075-00
C72	CAPACITOR, FIXED, MICA: 130 uuf $\pm 5\%$ , 500 v d-c; Electro Motive part no. DM15F131J500WV	912-2825-00
C73	CAPACITOR, VARIABLE, CERAMIC: same as C3	917-1075-00
C74	CAPACITOR, FIXED, MICA: same as C21	912-2805-00
C75	CAPACITOR, VARIABLE, CERAMIC: same as C3	917-1075-00
C76	CAPACITOR, VARIABLE, CERAMIC: same as C3	917-1075-00
C77	CAPACITOR, FIXED, CERAMIC: same as C11	913-3009-00
C78	CAPACITOR, FIXED, MICA: same as C27; used on 75S-3 only	912-2760-00
C79	CAPACITOR, FIXED, MICA: 47 uuf $\pm 10\%$ , 500 v d-c; Electro Motive part no. DM15E470K500WV	912-2793-00
C80	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C81	CAPACITOR, FIXED, MICA: same as C1; p/o T6	912-2867-00
C82	CAPACITOR, FIXED, MICA: same as C67	912-2766-00
C83	CAPACITOR, FIXED, MICA: 120 uuf $\pm 10\%$ , 500 v d-c; Electro Motive part no. DM15F121K500WV	912-2823-00
C84	CAPACITOR, FIXED, MICA: same as C53	912-2865-00
C85	NOT USED	
C86	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C87	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C88	NOT USED	
C89	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C90	CAPACITOR, FIXED, CERAMIC: same as C11	913-3009-00
C91	P/O L4	
C92	CAPACITOR, FIXED, CERAMIC: 3 uuf $\pm 1/4$ uuf, 500 v d-c; Centralab	916-0144-00
C93	CAPACITOR, FIXED, MICA: same as C27	912-2760-00
C94	CAPACITOR, FIXED, MICA: same as C41	912-2817-00
C95	CAPACITOR, FIXED, MICA: same as C4	912-2843-00
C96	NOT USED	

# SECTION 6

## Parts List

ITEM	DESCRIPTION	COLLINS PART NUMBER
V5	ELECTRON TUBE: twin triode; Radio Corp. of America part no. 12AX7	255-0201-00
V6	ELECTRON TUBE: glass envelope; pentode; Radio Corp. of America part no. 6BA6	255-0185-00
V7	ELECTRON TUBE: same as V6	255-0185-00
V8	ELECTRON TUBE: same as V3	255-0379-00
V9	ELECTRON TUBE: same as V1	255-0226-00
V10	ELECTRON TUBE: duplex-diode-triode; Radio Corp. of America part no. 6AT6	255-0190-00
V11	ELECTRON TUBE: pentode; General Electric Co. part no. 6BB5	255-0330-00
W1	CABLE ASSEMBLY: 3 conductor no. 18 AWG, A. C. plug and power connector (P6)	544-3121-00
XDS1	LAMPHOLDER: for use with miniature bayonet bulb; 1-3/8 in. lg o/a; Micarta Fabrications, Inc. part no. DB718	262-1210-00
XF1	FUSEHOLDER: extractor post type; 125 v, 5 amp; accommodates 3AG cartridge fuse; Bussman Mfg. Co. part no. HKP1-16	265-1002-00
XV1	SOCKET, ELECTRON TUBE: 7-pin miniature; molded construction; low loss composition; 0.343 in. h, 0.812 in. w, 1.125 in. lg o/a dim., excl terminals; Elco Mfg. Co., Inc. part no. 241BC	220-1044-00
XV2	SOCKET, ELECTRON TUBE: same as XV1	220-1044-00
XV3	SOCKET, ELECTRON TUBE: 9-pin miniature; molded construction; low loss composition; Elco Mfg. Co., Inc. part no. 274BC	220-1054-00
XV4	SOCKET, ELECTRON TUBE: same as XV3	220-1054-00
XV5	SOCKET, ELECTRON TUBE: same as XV3	220-1054-00
XV6	SOCKET, ELECTRON TUBE: same as XV1	220-1044-00
XV7	SOCKET, ELECTRON TUBE: same as XV1	220-1044-00
XV8	SOCKET, ELECTRON TUBE: same as XV3	220-1054-00
XV9	SOCKET, ELECTRON TUBE: same as XV1	220-1044-00
XV10	SOCKET, ELECTRON TUBE: same as XV1	220-1044-00
XV11	SOCKET, ELECTRON TUBE: same as XV1	220-1044-00
Y1	CRYSTAL UNIT, QUARTZ: 6.555-mc crystal frequency; 3.4- to 3.6-mc operating frequency; Midland Mfg. Co. part no. MO 8728	290-8728-00
Y2	CRYSTAL UNIT, QUARTZ: 6.755-mc crystal frequency; 3.6- to 3.8-mc operating frequency; Midland Mfg. Co. part no. MO 8729	290-8729-00
Y3	CRYSTAL UNIT, QUARTZ: 6.955-mc crystal frequency; 3.8- to 4.0-mc operating frequency; Midland Mfg. Co. part no. MO 8730	290-8730-00
Y4	CRYSTAL UNIT, QUARTZ: 10.155-mc crystal frequency; 7.0- to 7.2-mc operating frequency; Midland Mfg. Co. part no. MO 8731	290-8731-00
Y5	CRYSTAL UNIT, QUARTZ: 10.355-mc crystal frequency; 7.2- to 7.4-mc operating frequency; Midland Mfg. Co. part no. MO 8732	290-8732-00
Y6	CRYSTAL UNIT, QUARTZ: 8.5775-mc crystal frequency; 14.0- to 14.2-mc operating frequency; Midland Mfg. Co. part no. MO 8733	290-8733-00
Y7	CRYSTAL UNIT, QUARTZ: 8.6775-mc crystal frequency; 14.2- to 14.4-mc operating frequency; Midland Mfg. Co. part no. MO 8734	290-8734-00
Y8	CRYSTAL UNIT, QUARTZ: 8.9775-mc crystal frequency; 14.8- to 15.0-mc operating frequency; Midland Mfg. Co. part no. MO 8735	290-8735-00
Y9	CRYSTAL UNIT, QUARTZ: 12.0775-mc crystal frequency; 21.0- to 21.2-mc operating frequency; Midland Mfg. Co. part no. MO 8736	290-8736-00
Y10	CRYSTAL UNIT, QUARTZ: 12.1775-mc crystal frequency; 21.2- to 21.4-mc operating frequency; Midland Mfg. Co. part no. MO 8737	290-8737-00
Y11	CRYSTAL UNIT, QUARTZ: 12.2775-mc crystal frequency; 21.4- to 21.6-mc operating frequency; Midland Mfg. Co. part no. MO 8738	290-8738-00
Y12	CRYSTAL UNIT, QUARTZ: 15.8275-mc crystal frequency; 28.5- to 28.7-mc operating frequency; Midland Mfg. Co. part no. MO 8691	290-8691-00
Y13	NOT USED	

ITEM	DESCRIPTION	COLLINS PART NUMBER
Y14	NOT USED	
Y15	CRYSTAL UNIT, QUARTZ: 453.650-kc frequency; Midland Mfg. Co. part no. MO 8705	290-8705-00
Y16	CRYSTAL UNIT, QUARTZ: 456.350-kc frequency; Midland Mfg. Co. part no. MO 8706	290-8706-00
Y17	CRYSTAL UNIT, QUARTZ: 100.000-kc frequency; Billey Electric Co.	290-8454-00
70K-2 OSCILLATOR		522-1093-00
*C301	CAPACITOR, FIXED, CERAMIC: 20 uuf $\pm 20\%$ , 500 v d-c; Centralab part no. DA933-051	913-2879-00
*C301	CAPACITOR, FIXED, CERAMIC: 20 uuf $\pm 20\%$ , 500 v d-c; Centralab part no. DA933-050	913-2880-00
*C301	CAPACITOR, FIXED, CERAMIC: 20 uuf $\pm 20\%$ , 500 v d-c; Centralab part no. DA933-049	913-2881-00
*C301	CAPACITOR, FIXED, CERAMIC: 20 uuf $\pm 20\%$ , 500 v d-c; Centralab part no. DA933-048	913-2882-00
*C301	CAPACITOR, FIXED, CERAMIC: 20 uuf $\pm 20\%$ , 500 v d-c; Centralab part no. DA934-042	913-2883-00
*C301	CAPACITOR, FIXED, CERAMIC: 20 uuf $\pm 20\%$ , 500 v d-c; Centralab part no. DA934-038	913-2884-00
*C301	CAPACITOR, FIXED, CERAMIC: 100 uuf $\pm 20\%$ , 500 v d-c; Centralab part no. DA931-022	913-2897-00
*C301	CAPACITOR, FIXED, CERAMIC: 100 uuf $\pm 20\%$ , 500 v d-c; Centralab part no. DA932-008	913-2898-00
*C301	CAPACITOR, FIXED, CERAMIC: 100 uuf $\pm 20\%$ , 500 v d-c; Centralab part no. DA932-009	913-2899-00
C302	CAPACITOR, FIXED, MICA: 1000 uuf $\pm 1\%$ , 500 v d-c; Electro Motive part no. DM20F102F500WV	912-1749-00
C303	CAPACITOR, FIXED, MICA: 3000 uuf $\pm 10\%$ , 500 v d-c; Electro Motive part no. DM20F302F500WV	912-1748-00
C304	CAPACITOR, FIXED, MICA: 200 uuf $\pm 1\%$ , 300 v d-c; Electro Motive part no. DM15E201F300WV	912-3468-00
*C305	CAPACITOR, FIXED, CERAMIC: 100 uuf $\pm 2\%$ , 500 v d-c; Centralab part no. DA932-005	913-0074-00
*C305	CAPACITOR, FIXED, CERAMIC: 100 uuf $\pm 2\%$ , 500 v d-c; Centralab part no. DA933-017	913-0246-00
C306	CAPACITOR, FIXED, CERAMIC: 0.02 uf $\pm 60\%$ -40%, 250 v d-c; Sprague Electric Co. part no. 20C109	913-2097-00
C307	CAPACITOR, FIXED, CERAMIC: same as C306	917-1073-00
C308	CAPACITOR, VARIABLE, CERAMIC: 5.0 uuf min to 37.5 uuf max, 350 v d-c; Erie Resistor part no. 557018 COPO 39R	
C309	CAPACITOR, FIXED, CERAMIC: same as C306	913-2097-00
C310	CAPACITOR, FIXED, CERAMIC: same as C306	913-2097-00
CR301	DIODE: germanium; Sylvania part no. 1N34A	353-0103-00
L301	TRIMMER ASSEMBLY: Special	543-7323-00
L302	TRIMMER ASSEMBLY: same as L301	543-7323-00
L303	INDUCTOR, TUNING: Special	543-7333-00
L304	COIL, RADIO FREQUENCY: single layer wound, magnet wire, 3.30-uh inductance; Delevan Electronics	240-0695-00
R301	RESISTOR, COMPOSITION: 0.10 megohm $\pm 10\%$ , 1/2 w; Allen-Bradley type EB	745-1436-00
R302	RESISTOR, COMPOSITION: 82,000 ohms $\pm 10\%$ , 1/2 w; Allen-Bradley type EB	745-1433-00
R303	RESISTOR, COMPOSITION: same as R301	745-1436-00
T301	TRANSFORMER, RADIO FREQUENCY: pri. 380 uh nom, 790 kc; sec. 2.7 uh nom, 2.6 mc; Communication Coil	240-0665-00
V301	ELECTRON TUBE: type 6AU6; General Electric part no. 6AU6	255-0202-00

\*Select per operational requirement.



SECTION 6  
Parts List

ITEM	DESCRIPTION	COLLINS PART NUMBER
R13	RESISTOR, VARIABLE, COMPOSITION: 250 ohms ±30%, 0.2 w; Chicago Telephone type 70	376-4602-00
R14	RESISTOR, FIXED, COMPOSITION: same as R3	745-1352-00
R15	RESISTOR, FIXED, COMPOSITION: 15,000 ohms ±10%, 1 w; Allen-Bradley type GB	745-3401-00
R16	RESISTOR, FIXED, COMPOSITION: same as R2	745-1422-00
R17	RESISTOR, FIXED, COMPOSITION: 100 ohms ±10%, 1/2 w; Allen-Bradley type EB	745-1310-00
R18	RESISTOR, FIXED, COMPOSITION: same as R3	745-1352-00
R19	RESISTOR, FIXED, COMPOSITION: same as R11	745-1436-00
R20	NOT USED	
R21	RESISTOR, FIXED, COMPOSITION: same as R8	745-1303-00
R22	RESISTOR, FIXED, COMPOSITION: same as R3	745-1352-00
R23	RESISTOR, FIXED, COMPOSITION: same as R4	745-1450-00
R24	RESISTOR, FIXED, COMPOSITION: same as R1	745-1499-00
R25	RESISTOR, FIXED, COMPOSITION: 5600 ohms ±10%, 1/2 w; Allen-Bradley type EB	745-1384-00
R26	NOT USED	
R27	RESISTOR, FIXED, COMPOSITION: same as R17	745-1310-00
R28	RESISTOR, FIXED, COMPOSITION: same as R11	745-1436-00
R29	RESISTOR, FIXED, COMPOSITION: 6800 ohms ±10%, 1/2 w; Allen-Bradley type EB	745-1387-00
R30	RESISTOR, FIXED, COMPOSITION: same as R2	745-1422-00
R31	RESISTOR, VARIABLE, COMPOSITION: 10,000 ohms ±30%, 1/4 w; (includes R56); Allen-Bradley type CB	376-2151-00
R32	RESISTOR, FIXED, COMPOSITION: 12,000 ohms ±10%, 1/2 w; Allen-Bradley type EB	745-1398-00
R33	RESISTOR, FIXED, COMPOSITION: 330 ohms ±10%, 1/2 w; Allen-Bradley type EB	745-1331-00
R34	RESISTOR, FIXED, COMPOSITION: same as R11	745-1436-00
R35	RESISTOR, FIXED, COMPOSITION: same as R4	745-1450-00
R36	RESISTOR, FIXED, COMPOSITION: 1.0 megohm ±10%, 1/2 w; Allen-Bradley type EB	745-1478-00
R37	RESISTOR, FIXED, COMPOSITION: same as R4	745-1450-00
R38	RESISTOR, FIXED, COMPOSITION: same as R3	745-1352-00
R39	RESISTOR, FIXED, COMPOSITION: same as R11	745-1436-00
R40	RESISTOR, FIXED, COMPOSITION: same as R7	745-1429-00
R41	RESISTOR, FIXED, COMPOSITION: 100 ohms ±10%, 1/2 w; p/o P1; Allen-Bradley type EB	745-1310-00
R42	RESISTOR, FIXED, COMPOSITION: 680 ohms ±10%, 1/2 w; Allen-Bradley type EB	745-1345-00
R43	RESISTOR, FIXED, COMPOSITION: same as R11	745-1436-00
R44	RESISTOR, FIXED, COMPOSITION: same as R11	745-1436-00
R45	RESISTOR, FIXED, COMPOSITION: same as R3	745-1352-00
R46	RESISTOR, FIXED, COMPOSITION: same as R36	745-1478-00
R47	RESISTOR, FIXED, COMPOSITION: 1.5 megohms ±10%, 1/2 w; Allen-Bradley type EB	745-1485-00
R48	RESISTOR, FIXED, COMPOSITION: same as R4	745-1450-00
R49	RESISTOR, FIXED, COMPOSITION: same as R3	745-1352-00
R50	RESISTOR, FIXED, COMPOSITION: 4700 ohms ±10%, 1/2 w; Allen-Bradley type EB	745-1380-00
R51	RESISTOR, FIXED, COMPOSITION: 470 ohms ±10%, 2 w; Allen-Bradley type HB	745-5638-00
R52	RESISTOR, FIXED, COMPOSITION: 3900 ohms ±10%, 2 w; Allen-Bradley type HB	745-5677-00
R53	RESISTOR, FIXED, COMPOSITION: same as R2	745-1422-00
R54	RESISTOR, FIXED, COMPOSITION: 22,000 ohms ±10%, 1/2 w; Allen-Bradley type EB	745-1408-00
R55	RESISTOR, FIXED, COMPOSITION: same as R32	745-1398-00
R56	P/O R31	
R57	RESISTOR, VARIABLE, COMPOSITION: 1000 ohms ±30%, 0.2 w; Chicago Telephone type 70	376-4601-00
R58	RESISTOR, FIXED, COMPOSITION: same as R32	745-1398-00
R59	RESISTOR, FIXED, COMPOSITION: 1000 ohms ±10%, 2 w; Allen-Bradley type HB	745-5652-00
R60	RESISTOR, FIXED, COMPOSITION: same as R11	745-1436-00
R61	RESISTOR, FIXED, COMPOSITION: 470 ohms ±10%, 1/2 w; Allen-Bradley type EB	745-1338-00
R62	RESISTOR, FIXED, COMPOSITION: 10,000 ohms ±10%, 2 w; Allen-Bradley type HB	745-5694-00
R63	RESISTOR, FIXED, COMPOSITION: same as R36	745-1478-00
R64	RESISTOR, FIXED, COMPOSITION: same as R11	745-1436-00
R65	RESISTOR, FIXED, COMPOSITION: same as R36	745-1478-00
R66	RESISTOR, FIXED, COMPOSITION: same as R61	745-1338-00
R67	RESISTOR, FIXED, COMPOSITION: 1200 ohms ±10%, 1/2 w; Allen-Bradley type EB	745-1356-00
R68	RESISTOR, FIXED, COMPOSITION: same as R50	745-1380-00
R69	RESISTOR, FIXED, COMPOSITION: same as R2	745-1422-00
R70	RESISTOR, FIXED, COMPOSITION: same as R11	745-1436-00
R71	RESISTOR, FIXED, COMPOSITION: same as R42	745-1345-00
R72	RESISTOR, FIXED, COMPOSITION: 120 ohms ±10%, 1/2 w; Allen-Bradley type EB	745-1314-00
R73	RESISTOR, FIXED, COMPOSITION: same as R3	745-1352-00

ITEM	DESCRIPTION	COLLINS PART NUMBER
R74	RESISTOR, FIXED, COMPOSITION: 0.33 megohm ±10%, 1/2 w; Allen-Bradley type EB	745-1457-00
R75	RESISTOR, FIXED, COMPOSITION: 47 ohms ±10%, 1/2 w; Allen-Bradley type EB	745-1296-00
R76	P/O Q Multiplier	
R77	P/O Q Multiplier	
R78	RESISTOR, FIXED, COMPOSITION: same as R74	745-1457-00
R79	RESISTOR, FIXED, COMPOSITION: same as R2	745-1422-00
R80	P/O BFO (L10)	
R81	RESISTOR, VARIABLE: 100,000 ohms ±30%, 1/4 w (includes S13); Allen-Bradley type CB	376-2530-00
R82	RESISTOR, FIXED, COMPOSITION: 27,000 ohms ±10%, 1/2 w; Allen-Bradley type EB	745-1412-00
R83	RESISTOR, FIXED, COMPOSITION: 39,000 ohms ±10%, 1/2 w; Allen-Bradley type EB	745-1419-00
R84	RESISTOR, FIXED, COMPOSITION: 10,000 ohms ±10%, 1/2 w; Allen-Bradley type EB	745-1394-00
R85	RESISTOR, FIXED, COMPOSITION: same as R84	745-1394-00
R86	RESISTOR, FIXED, COMPOSITION: same as R3	745-1352-00
R87	RESISTOR, FIXED, COMPOSITION: same as R75	745-1296-00
S1A	SWITCH, ROTARY: 1 circuit, 14 position, 1 section; 1 moving, 16 fixed contacts; Oak Mfg. Co. part no. 91873-OK1	259-0981-00
S1B	SWITCH SECTION, ROTARY: 1 circuit (1 pole) 14 position, 1 moving, 16 fixed contacts (p/o 75S-3A only); Oak Mfg. Co. type CK	269-1977-00
S2	SWITCH SECTION, ROTARY: 1 circuit, 14 posi- tion, 1 moving, 10 fixed contacts; Oak Mfg. Co. type CK	269-2027-00
S3	SWITCH SECTION, ROTARY: same as S2	269-2027-00
S4	SWITCH SECTION, ROTARY: same as S2	269-2027-00
S5	SWITCH SECTION, ROTARY: 1 section, 4 position, 3 circuit, 12 fixed, 3 moving contacts; Oak Mfg. Co. type F	259-0949-00
S6	P/O S11	
S7	SWITCH SECTION, ROTARY: 2 circuit (2 pole) 12 position, 2 moving, 11 fixed contacts; Oak Mfg. Co.	269-2309-00
S8	SWITCH SECTION, ROTARY: 2 circuit (2 pole) 12 position, 2 moving, 10 fixed contacts; Oak Mfg. Co. part no. 218156-F	269-2310-00
S9	SWITCH SECTION, ROTARY: 2 circuit (2 pole) 12 position, 2 moving, 9 fixed contacts; Oak Mfg. Co. type F	269-2311-00
S10	P/O Q Multiplier	
S11	SWITCH, ROTARY: 3 circuit (3 pole) 4 position, 3 moving, 14 fixed contacts (includes S6); Oak Mfg. Co. part no. 217828-52	259-1483-00
S12	SWITCH, ROTARY: 1 circuit (1 pole) 3 position, 1 moving, 4 fixed contacts; Grigsby Co., Inc. type 4 MLR	259-1491-00
S13	P/O R81	
S14	SWITCH, ROTARY: 1 circuit (1 pole) 2 position, 1 moving contact, 3 fixed contacts (p/o 75S-3A only); Oak Mfg. Co. part no. 191774-23	259-0980-00
T1	TRANSFORMER, RADIO FREQUENCY: 3.4 to 30 mc; (includes C24, C26)	543-8120-002
T2	TRANSFORMER, RADIO FREQUENCY: 3.4 to 30 mc; (includes C44, C81)	543-8122-002
T3	TRANSFORMER AND COIL ASSEMBLY: 3.055 mc freq; 25/32 in. by 25/32 in. by 2.875 in. overall; Communications Coil part no. X-185-1A and X-185-1B	278-1721-00
T4	TRANSFORMER, INTERMEDIATE FREQUENCY: 440- to 470-kc frequency range; Communications Coil part no. X-083-1	278-0281-00
T5	TRANSFORMER, INTERMEDIATE FREQUENCY: same as T4	278-0281-00
T6	TRANSFORMER, INTERMEDIATE FREQUENCY: same as T4	278-0281-00
T7	TRANSFORMER, AUDIO FREQUENCY: pri 2500 ohms; sec. 500 ohms and 4 ohms (includes C35, C36); Stancor Electronics part no. 27232	667-0302-00
T8	TRANSFORMER, POWER: pri. 115 v, 50/60 cps, sec. no. 1, overall 220 v CT; sec. no. 2, 6.3 v (includes C103, C108); Stancor Electronics part no. 27868	662-0301-00
V1	ELECTRON TUBE: glass envelope; pentode; Radio Corp. of America part no. 6DC6	255-0226-00
V2	ELECTRON TUBE: same as V1	255-0226-00
V3	ELECTRON TUBE: miniature pentode; Radio Corp. of America part no. 6EA8	255-0379-00
V4	ELECTRON TUBE: same as V3	255-0379-00

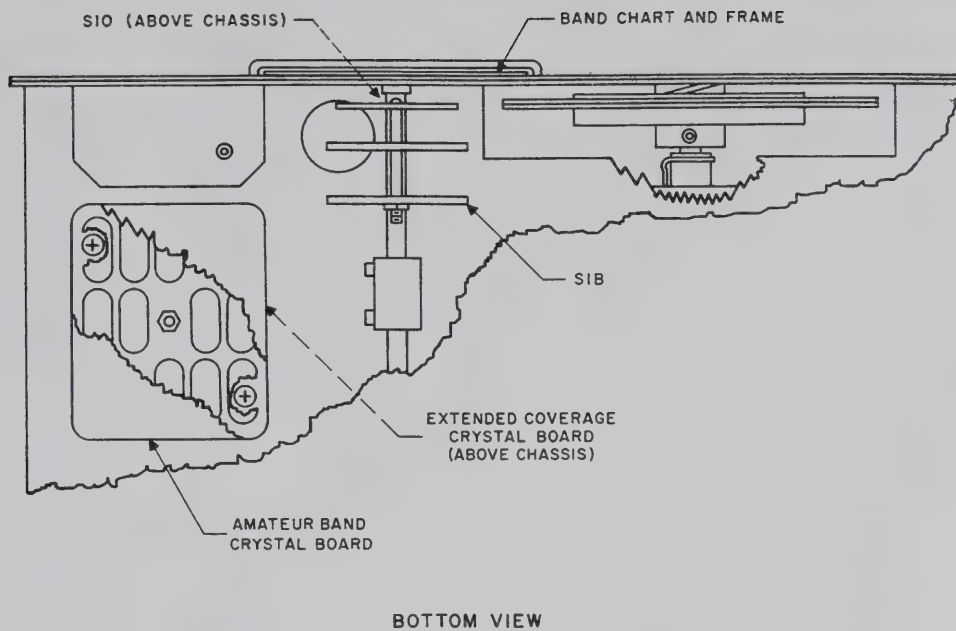


Figure 6-1. 75S-3A, Location of Added Components

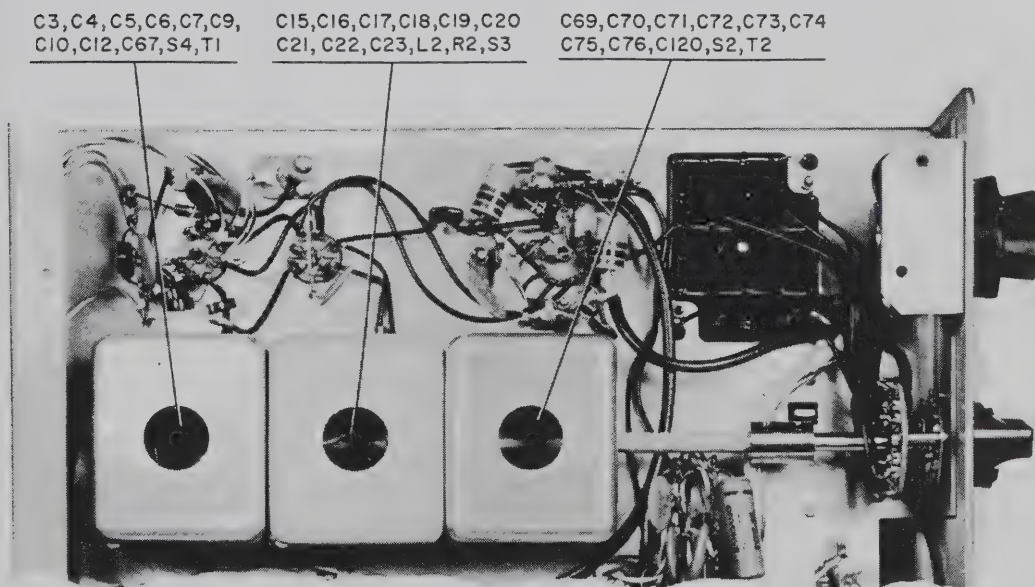


Figure 6-2. Bottom Right View, Parts Location



GENERAL COVERAGE CRYSTALS AVAILABLE								
CRYSTAL FREQUENCY (kc)	FOR OPERATING FREQUENCY (mc)	PART NUMBER	CRYSTAL FREQUENCY (kc)	FOR OPERATING FREQUENCY (mc)	PART NUMBER	CRYSTAL FREQUENCY (kc)	FOR OPERATING FREQUENCY (mc)	PART NUMBER
6555.000	3.4-3.6	290-9009-00	8577.500	14.0-14.2	290-9062-00	12977.500	22.8-23.0	290-9106-00
6755.000	3.6-3.8	290-9010-00	8652.500	14.15-14.35	290-9180-00	13077.500	23.0-23.2	290-9107-00
6955.000	3.8-4.0	290-9011-00	8677.500	14.2-14.4	290-9063-00	13177.500	23.2-23.4	290-9108-00
7155.000	4.0-4.2	290-9012-00	8777.500	14.4-14.6	290-9064-00	13277.500	23.4-23.6	290-9109-00
7355.000	4.2-4.4	290-9013-00	8877.500	14.6-14.8	290-9065-00	13377.500	23.6-23.8	290-9110-00
7555.000	4.4-4.6	290-9014-00	8977.500	14.8-15.0	290-9066-00	13477.500	23.8-24.0	290-9111-00
7755.000	4.6-4.8	290-9015-00	9077.500	15.0-15.2	290-9067-00	13577.500	24.0-24.2	290-9112-00
7955.000	4.8-5.0	290-9016-00	9177.500	15.2-15.4	290-9068-00	13677.500	24.2-24.4	290-9113-00
9755.000	6.6-6.8	290-9025-00	9277.500	15.4-15.6	290-9069-00	13777.500	24.4-24.6	290-9114-00
9955.000	6.8-7.0	290-9026-00	9377.500	15.6-15.8	290-9070-00	13877.500	24.6-24.8	290-9115-00
10155.000	7.0-7.2	290-9027-00	9477.500	15.8-16.0	290-9071-00	13977.500	24.8-25.0	290-9116-00
10355.000	7.2-7.4	290-9028-00	9577.500	16.0-16.2	290-9072-00	14077.500	25.0-25.2	290-9117-00
10555.000	7.5-7.6	290-9029-00	9677.500	16.2-16.4	290-9073-00	14177.500	25.2-25.4	290-9118-00
10755.000	7.4-7.6	290-9030-00	9777.500	16.4-16.6	290-9074-00	14277.500	25.4-25.6	290-9119-00
10955.000	7.8-8.0	290-9031-00	9877.500	16.6-16.8	290-9075-00	14377.500	25.6-25.8	290-9120-00
11155.000	8.0-8.2	290-9032-00	9977.500	16.8-17.0	290-9076-00	14477.500	25.8-26.0	290-9121-00
11355.000	8.2-8.4	290-9033-00	10077.500	17.0-17.2	290-9077-00	14577.500	26.0-26.2	290-9122-00
11555.000	8.4-8.6	290-9034-00	10177.500	17.2-17.4	290-9078-00	14677.500	26.2-26.4	290-9123-00
11755.000	8.6-8.8	290-9035-00	10277.500	17.4-17.6	290-9079-00	14777.500	26.4-26.6	290-9124-00
11955.000	8.8-9.0	290-9036-00	10377.500	17.6-17.8	290-9080-00	14877.500	26.6-26.8	290-9125-00
12155.000	9.0-9.2	290-9037-00	10477.500	17.8-18.0	290-9081-00	14977.500	26.8-27.0	290-9126-00
12355.000	9.2-9.4	290-9038-00	10577.500	18.0-18.2	290-9082-00	15077.500	27.0-27.2	290-9127-00
12555.000	9.4-9.6	290-9039-00	10677.500	18.2-18.4	290-9083-00	15177.500	27.2-27.4	290-9128-00
12755.000	9.6-9.8	290-9040-00	10777.500	18.4-18.6	290-9084-00	15277.500	27.4-27.6	290-9129-00
12955.000	9.8-10.0	290-9041-00	10877.500	18.6-18.8	290-9085-00	15377.500	27.6-27.8	290-9130-00
13155.000	10.0-10.2	290-9042-00	10977.500	18.8-19.0	290-9086-00	15477.500	27.8-28.0	290-9131-00
13355.000	10.2-10.4	290-9043-00	11077.500	19.0-19.2	290-9087-00	15527.500	27.9-28.1	290-9142-00
13555.000	10.4-10.6	290-9044-00	11177.500	19.2-19.4	290-9088-00	15577.500	28.0-28.2	290-9132-00
13755.000	10.6-10.8	290-9045-00	11277.500	19.4-19.6	290-9089-00	15627.500	28.1-28.3	290-9143-00
13955.000	10.8-11.0	290-9046-00	11377.500	19.6-19.8	290-9090-00	15677.500	28.2-28.4	290-9133-00
14155.000	11.0-11.2	290-9047-00	11477.500	19.8-20.0	290-9091-00	15727.500	28.3-28.5	290-9144-00
14355.000	11.2-11.4	290-9048-00	11577.500	20.0-20.2	290-9092-00	15777.500	28.4-28.6	290-9134-00
14555.000	11.4-11.6	290-9049-00	11677.500	20.2-20.4	290-9093-00	15827.500	28.5-28.7	290-9201-00
14755.000	11.6-11.8	290-9050-00	11777.500	20.4-20.6	290-9094-00	15877.500	28.6-28.8	290-9135-00
14955.000	11.8-12.0	290-9051-00	11877.500	20.6-20.8	290-9095-00	15927.500	28.7-28.9	290-9145-00
7577.500	12.0-12.2	290-9052-00	11977.500	20.8-21.0	290-9096-00	15977.500	28.8-29.0	290-9136-00
7677.500	12.2-12.4	290-9053-00	12077.500	21.0-21.2	290-9097-00	16027.500	28.9-29.1	290-9146-00
7777.500	12.4-12.6	290-9054-00	12177.500	21.2-21.4	290-9098-00	16077.500	29.0-29.2	290-9137-00
7877.500	12.6-12.8	290-9055-00	12277.500	21.4-21.6	290-9099-00	16127.500	29.1-29.3	290-9147-00
7977.500	12.8-13.0	290-9056-00	12377.500	21.6-21.8	290-9100-00	16177.500	29.2-29.4	290-9138-00
8077.500	13.0-13.2	290-9057-00	12477.500	21.8-22.0	290-9101-00	16227.500	29.3-29.5	290-9148-00
8177.500	13.2-13.4	290-9058-00	12577.500	22.0-22.2	290-9102-00	16277.500	29.4-29.6	290-9139-00
8277.500	13.4-13.6	290-9059-00	12677.500	22.2-22.4	290-9103-00	16327.500	29.5-29.7	290-9149-00
8377.500	13.6-13.8	290-9060-00	12777.500	22.4-22.6	290-9104-00	16377.500	29.6-29.8	290-9140-00
8477.500	13.8-14.0	290-9061-00	12877.500	22.6-22.8	290-9105-00	16477.500	29.8-30.0	290-9141-00

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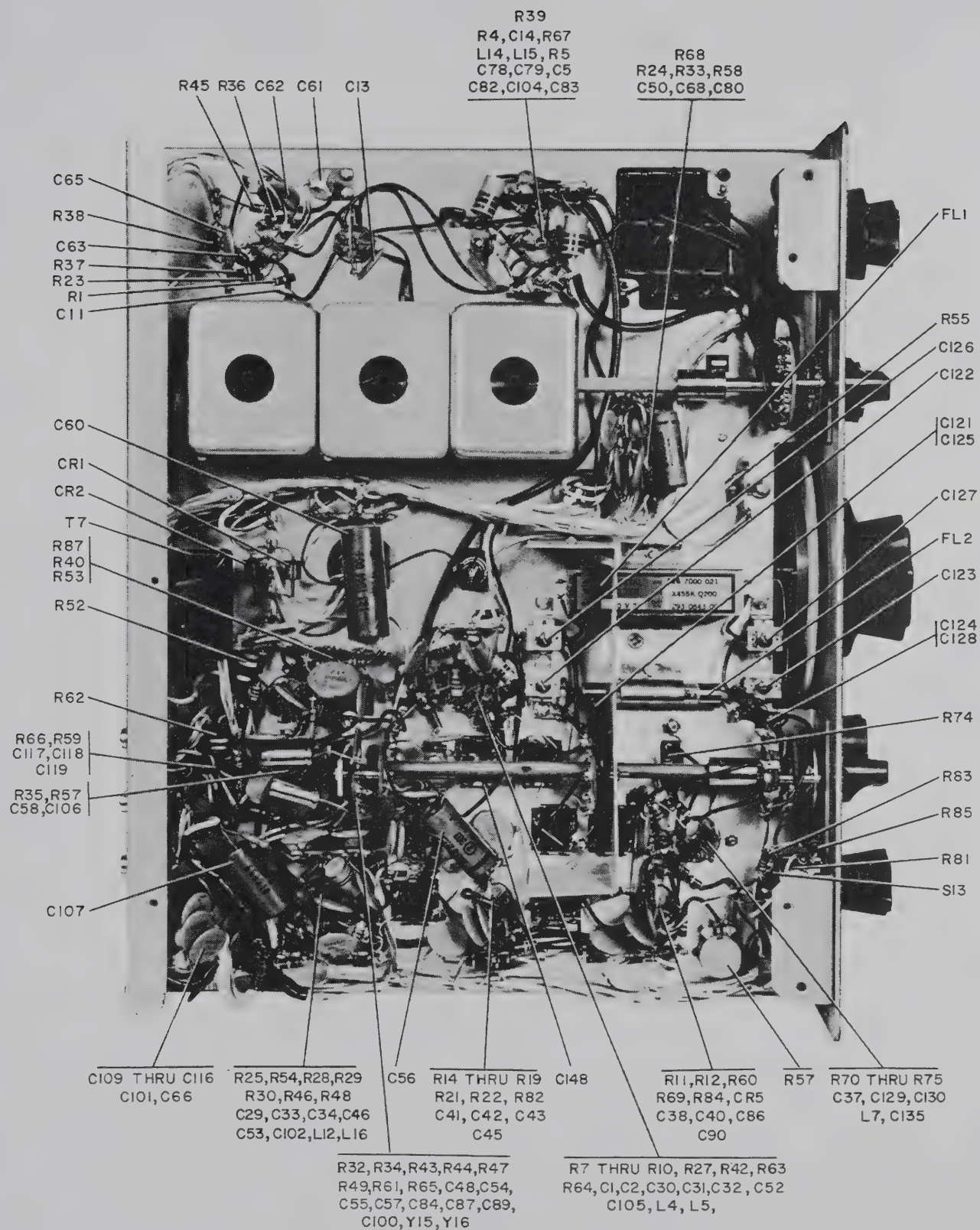


Figure 6-3. Bottom View, Parts Location



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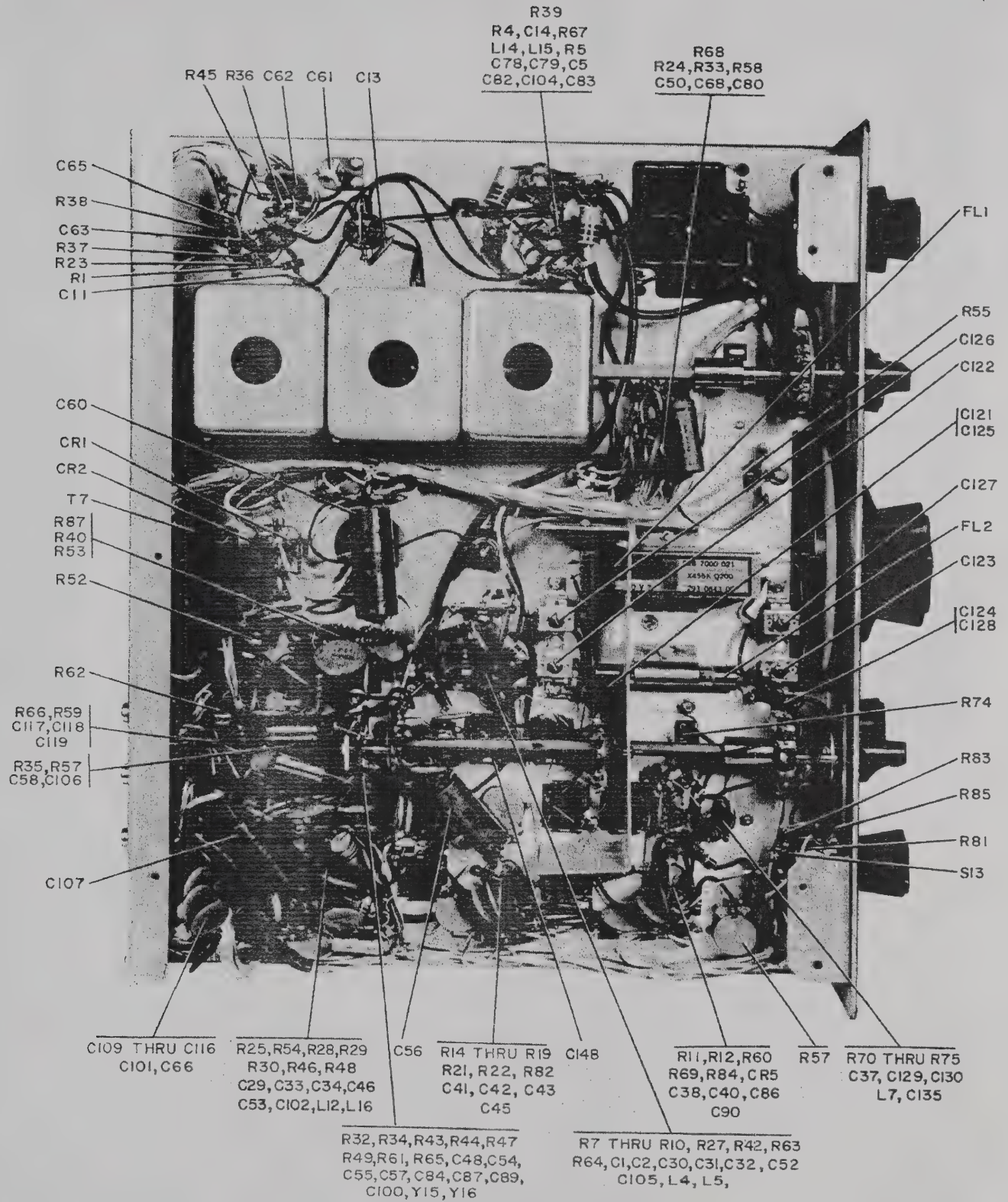


Figure 6-3. Bottom View, Parts Location





GENERAL COVERAGE CRYSTALS AVAILABLE									
CRYSTAL FREQUENCY (kc)	FOR OPERATING FREQUENCY (mc)	PART NUMBER	CRYSTAL FREQUENCY (kc)	FOR OPERATING FREQUENCY (mc)	PART NUMBER	CRYSTAL FREQUENCY (kc)	FOR OPERATING FREQUENCY (mc)	PART NUMBER	
6555.000	3.4-3.6	290-9009-00	8577.500	14.0-14.2	290-9062-00	12977.500	22.8-23.0	290-9106-00	
6755.000	3.6-3.8	290-9010-00	8652.500	14.15-14.35	290-9180-00	13077.500	23.0-23.2	290-9107-00	
6955.000	3.8-4.0	290-9011-00	8677.500	14.2-14.4	290-9063-00	13177.500	23.2-23.4	290-9108-00	
7155.000	4.0-4.2	290-9012-00	8777.500	14.4-14.6	290-9064-00	13277.500	23.4-23.6	290-9109-00	
7355.000	4.2-4.4	290-9013-00	8877.500	14.6-14.8	290-9065-00	13377.500	23.6-23.8	290-9110-00	
7555.000	4.4-4.6	290-9014-00	8977.500	14.8-15.0	290-9066-00	13477.500	23.8-24.0	290-9111-00	
7755.000	4.6-4.8	290-9015-00	9077.500	15.0-15.2	290-9067-00	13577.500	24.0-24.2	290-9112-00	
7955.000	4.8-5.0	290-9016-00	9177.500	15.2-15.4	290-9068-00	13677.500	24.2-24.4	290-9113-00	
9755.000	6.6-6.8	290-9025-00	9277.500	15.4-15.6	290-9069-00	13777.500	24.4-24.6	290-9114-00	
9955.000	6.8-7.0	290-9026-00	9377.500	15.6-15.8	290-9070-00	13877.500	24.6-24.8	290-9115-00	
10155.000	7.0-7.2	290-9027-00	9477.500	15.8-16.0	290-9071-00	13977.500	24.8-25.0	290-9116-00	
10355.000	7.2-7.4	290-9028-00	9577.500	16.0-16.2	290-9072-00	14077.500	25.0-25.2	290-9117-00	
10555.000	7.5-7.6	290-9029-00	9677.500	16.2-16.4	290-9073-00	14177.500	25.2-25.4	290-9118-00	
10755.000	7.4-7.6	290-9030-00	9777.500	16.4-16.6	290-9074-00	14277.500	25.4-25.6	290-9119-00	
10955.000	7.8-8.0	290-9031-00	9877.500	16.6-16.8	290-9075-00	14377.500	25.6-25.8	290-9120-00	
11155.000	8.0-8.2	290-9032-00	9977.500	16.8-17.0	290-9076-00	14477.500	25.8-26.0	290-9121-00	
11355.000	8.2-8.4	290-9033-00	10077.500	17.0-17.2	290-9077-00	14577.500	26.0-26.2	290-9122-00	
11555.000	8.4-8.6	290-9034-00	10177.500	17.2-17.4	290-9078-00	14677.500	26.2-26.4	290-9123-00	
11755.000	8.6-8.8	290-9035-00	10277.500	17.4-17.6	290-9079-00	14777.500	26.4-26.6	290-9124-00	
11955.000	8.8-9.0	290-9036-00	10377.500	17.6-17.8	290-9080-00	14877.500	26.6-26.8	290-9125-00	
12155.000	9.0-9.2	290-9037-00	10477.500	17.8-18.0	290-9081-00	14977.500	26.8-27.0	290-9126-00	
12355.000	9.2-9.4	290-9038-00	10577.500	18.0-18.2	290-9082-00	15077.500	27.0-27.2	290-9127-00	
12555.000	9.4-9.6	290-9039-00	10677.500	18.2-18.4	290-9083-00	15177.500	27.2-27.4	290-9128-00	
12755.000	9.6-9.8	290-9040-00	10777.500	18.4-18.6	290-9084-00	15277.500	27.4-27.6	290-9129-00	
12955.000	9.8-10.0	290-9041-00	10877.500	18.6-18.8	290-9085-00	15377.500	27.6-27.8	290-9130-00	
13155.000	10.0-10.2	290-9042-00	10977.500	18.8-19.0	290-9086-00	15477.500	27.8-28.0	290-9131-00	
13355.000	10.2-10.4	290-9043-00	11077.500	19.0-19.2	290-9087-00	15527.500	27.9-28.1	290-9142-00	
13555.000	10.4-10.6	290-9044-00	11177.500	19.2-19.4	290-9088-00	15577.500	28.0-28.2	290-9132-00	
13755.000	10.6-10.8	290-9045-00	11277.500	19.4-19.6	290-9089-00	15627.500	28.1-28.3	290-9143-00	
13955.000	10.8-11.0	290-9046-00	11377.500	19.6-19.8	290-9090-00	15677.500	28.2-28.4	290-9133-00	
14155.000	11.0-11.2	290-9047-00	11477.500	19.8-20.0	290-9091-00	15727.500	28.3-28.5	290-9144-00	
14355.000	11.2-11.4	290-9048-00	11577.500	20.0-20.2	290-9092-00	15777.500	28.4-28.6	290-9134-00	
14555.000	11.4-11.6	290-9049-00	11677.500	20.2-20.4	290-9093-00	15827.500	28.5-28.7	290-9201-00	
14755.000	11.6-11.8	290-9050-00	11777.500	20.4-20.6	290-9094-00	15877.500	28.6-28.8	290-9135-00	
14955.000	11.8-12.0	290-9051-00	11877.500	20.6-20.8	290-9095-00	15927.500	28.7-28.9	290-9145-00	
7577.500	12.0-12.2	290-9052-00	11977.500	20.8-21.0	290-9096-00	15977.500	28.8-29.0	290-9136-00	
7677.500	12.2-12.4	290-9053-00	12077.500	21.0-21.2	290-9097-00	16027.500	28.9-29.1	290-9146-00	
7777.500	12.4-12.6	290-9054-00	12177.500	21.2-21.4	290-9098-00	16077.500	29.0-29.2	290-9137-00	
7877.500	12.6-12.8	290-9055-00	12277.500	21.4-21.6	290-9099-00	16127.500	29.1-29.3	290-9147-00	
7977.500	12.8-13.0	290-9056-00	12377.500	21.6-21.8	290-9100-00	16177.500	29.2-29.4	290-9138-00	
8077.500	13.0-13.2	290-9057-00	12477.500	21.8-22.0	290-9101-00	16227.500	29.3-29.5	290-9148-00	
8177.500	13.2-13.4	290-9058-00	12577.500	22.0-22.2	290-9102-00	16277.500	29.4-29.6	290-9139-00	
8277.500	13.4-13.6	290-9059-00	12677.500	22.2-22.4	290-9103-00	16327.500	29.5-29.7	290-9149-00	
8377.500	13.6-13.8	290-9060-00	12777.500	22.4-22.6	290-9104-00	16377.500	29.6-29.8	290-9140-00	
8477.500	13.8-14.0	290-9061-00	12877.500	22.6-22.8	290-9105-00	16477.500	29.8-30.0	290-9141-00	

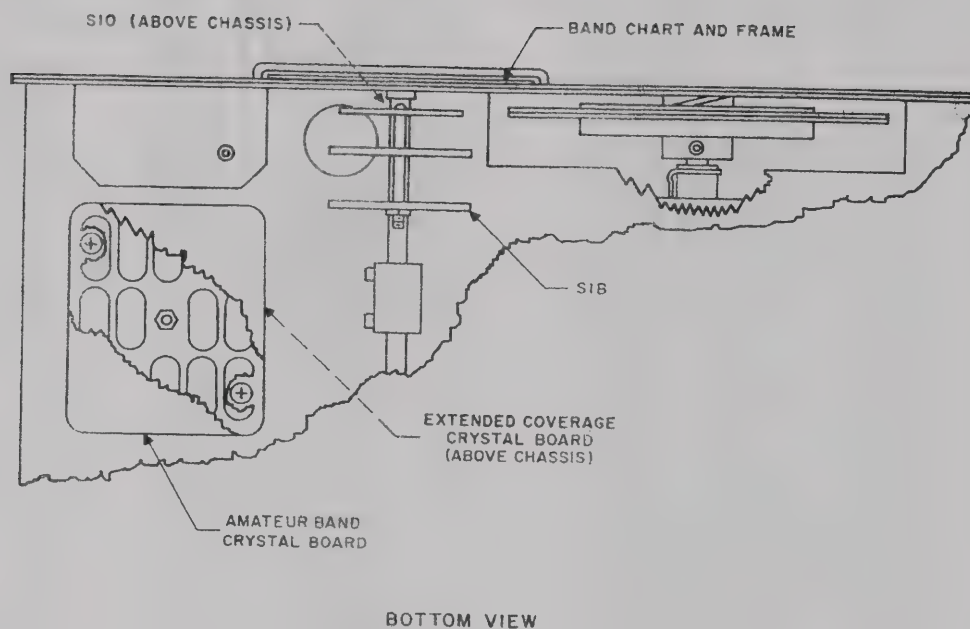


Figure 6-1. 75S-3A, Location of Added Components

C3, C4, C5, C6, C7, C9, C10, C12, C67, S4, T1	C15, C16, C17, C18, C19, C20 C21, C22, C23, L2, R2, S3	C69, C70, C71, C72, C73, C74 C75, C76, C120, S2, T2
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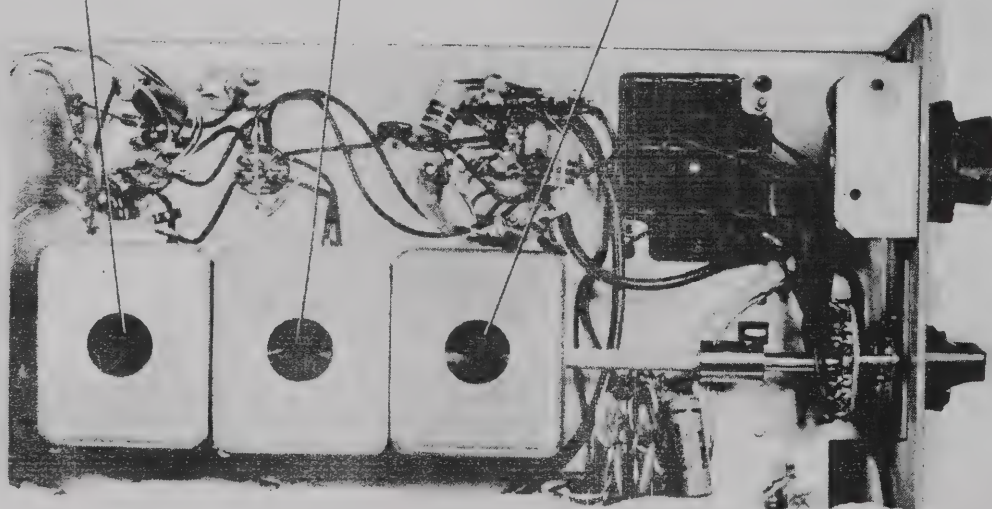


Figure 6-2. Bottom Right View, Parts Location



SECTION 6  
Parts List

ITEM	DESCRIPTION	COLLINS PART NUMBER
R13	RESISTOR, VARIABLE, COMPOSITION: 250 ohms $\pm 30\%$ , 0.2 w; Chicago Telephone type 70	376-4602-00
R14	RESISTOR, FIXED, COMPOSITION: same as R3	745-1352-00
R15	RESISTOR, FIXED, COMPOSITION: 15,000 ohms $\pm 10\%$ , 1 w; Allen-Bradley type GB	745-3401-00
R16	RESISTOR, FIXED, COMPOSITION: same as R2	745-1422-00
R17	RESISTOR, FIXED, COMPOSITION: 100 ohms $\pm 10\%$ , 1/2 w; Allen-Bradley type EB	745-1310-00
R18	RESISTOR, FIXED, COMPOSITION: same as R3	745-1352-00
R19	RESISTOR, FIXED, COMPOSITION: same as R11	745-1436-00
R20	NOT USED	
R21	RESISTOR, FIXED, COMPOSITION: same as R8	745-1303-00
R22	RESISTOR, FIXED, COMPOSITION: same as R3	745-1352-00
R23	RESISTOR, FIXED, COMPOSITION: same as R4	745-1450-00
R24	RESISTOR, FIXED, COMPOSITION: same as R1	745-1499-00
R25	RESISTOR, FIXED, COMPOSITION: 5600 ohms $\pm 10\%$ , 1/2 w; Allen-Bradley type EB	745-1384-00
R26	NOT USED	
R27	RESISTOR, FIXED, COMPOSITION: same as R17	745-1310-00
R28	RESISTOR, FIXED, COMPOSITION: same as R11	745-1436-00
R29	RESISTOR, FIXED, COMPOSITION: 6800 ohms $\pm 10\%$ , 1/2 w; Allen-Bradley type EB	745-1387-00
R30	RESISTOR, FIXED, COMPOSITION: same as R2	745-1422-00
R31	RESISTOR, VARIABLE, COMPOSITION: 10,000 ohms $\pm 30\%$ , 1/4 w; (includes R56); Allen-Bradley type CB	376-2151-00
R32	RESISTOR, FIXED, COMPOSITION: 12,000 ohms $\pm 10\%$ , 1/2 w; Allen-Bradley type EB	745-1398-00
R33	RESISTOR, FIXED, COMPOSITION: 330 ohms $\pm 10\%$ , 1/2 w; Allen-Bradley type EB	745-1331-00
R34	RESISTOR, FIXED, COMPOSITION: same as R11	745-1436-00
R35	RESISTOR, FIXED, COMPOSITION: same as R4	745-1450-00
R36	RESISTOR, FIXED, COMPOSITION: 1.0 megohm $\pm 10\%$ , 1/2 w; Allen-Bradley type EB	745-1478-00
R37	RESISTOR, FIXED, COMPOSITION: same as R4	745-1450-00
R38	RESISTOR, FIXED, COMPOSITION: same as R3	745-1352-00
R39	RESISTOR, FIXED, COMPOSITION: same as R11	745-1436-00
R40	RESISTOR, FIXED, COMPOSITION: same as R7	745-1429-00
R41	RESISTOR, FIXED, COMPOSITION: 100 ohms $\pm 10\%$ , 1/2 w; p/o P1; Allen-Bradley type EB	745-1310-00
R42	RESISTOR, FIXED, COMPOSITION: 680 ohms $\pm 10\%$ , 1/2 w; Allen-Bradley type EB	745-1345-00
R43	RESISTOR, FIXED, COMPOSITION: same as R11	745-1436-00
R44	RESISTOR, FIXED, COMPOSITION: same as R11	745-1436-00
R45	RESISTOR, FIXED, COMPOSITION: same as R3	745-1352-00
R46	RESISTOR, FIXED, COMPOSITION: same as R36	745-1478-00
R47	RESISTOR, FIXED, COMPOSITION: 1.5 megohms $\pm 10\%$ , 1/2 w; Allen-Bradley type EB	745-1485-00
R48	RESISTOR, FIXED, COMPOSITION: same as R4	745-1450-00
R49	RESISTOR, FIXED, COMPOSITION: same as R3	745-1352-00
R50	RESISTOR, FIXED, COMPOSITION: 4700 ohms $\pm 10\%$ , 1/2 w; Allen-Bradley type EB	745-1380-00
R51	RESISTOR, FIXED, COMPOSITION: 470 ohms $\pm 10\%$ , 2 w; Allen-Bradley type HB	745-5638-00
R52	RESISTOR, FIXED, COMPOSITION: 3900 ohms $\pm 10\%$ , 2 w; Allen-Bradley type HB	745-5677-00
R53	RESISTOR, FIXED, COMPOSITION: same as R2	745-1422-00
R54	RESISTOR, FIXED, COMPOSITION: 22,000 ohms $\pm 10\%$ , 1/2 w; Allen-Bradley type EB	745-1408-00
R55	RESISTOR, FIXED, COMPOSITION: same as R32	745-1398-00
R56	P/O R31	
R57	RESISTOR, VARIABLE, COMPOSITION: 1000 ohms $\pm 30\%$ , 0.2 w; Chicago Telephone type 70	376-4601-00
R58	RESISTOR, FIXED, COMPOSITION: same as R32	745-1398-00
R59	RESISTOR, FIXED, COMPOSITION: 1000 ohms $\pm 10\%$ , 2 w; Allen-Bradley type HB	745-5652-00
R60	RESISTOR, FIXED, COMPOSITION: same as R11	745-1436-00
R61	RESISTOR, FIXED, COMPOSITION: 470 ohms $\pm 10\%$ , 1/2 w; Allen-Bradley type EB	745-1338-00
R62	RESISTOR, FIXED, COMPOSITION: 10,000 ohms $\pm 10\%$ , 2 w; Allen-Bradley type HB	745-5694-00
R63	RESISTOR, FIXED, COMPOSITION: same as R36	745-1478-00
R64	RESISTOR, FIXED, COMPOSITION: same as R11	745-1436-00
R65	RESISTOR, FIXED, COMPOSITION: same as R36	745-1478-00
R66	RESISTOR, FIXED, COMPOSITION: same as R61	745-1338-00
R67	RESISTOR, FIXED, COMPOSITION: 1200 ohms $\pm 10\%$ , 1/2 w; Allen-Bradley type EB	745-1356-00
R68	RESISTOR, FIXED, COMPOSITION: same as R50	745-1380-00
R69	RESISTOR, FIXED, COMPOSITION: same as R2	745-1422-00
R70	RESISTOR, FIXED, COMPOSITION: same as R11	745-1436-00
R71	RESISTOR, FIXED, COMPOSITION: same as R42	745-1345-00
R72	RESISTOR, FIXED, COMPOSITION: 120 ohms $\pm 10\%$ , 1/2 w; Allen-Bradley type EB	745-1314-00
R73	RESISTOR, FIXED, COMPOSITION: same as R3	745-1352-00

ITEM	DESCRIPTION	COLLINS PART NUMBER
R74	RESISTOR, FIXED, COMPOSITION: 0.33 megohm $\pm 10\%$ , 1/2 w; Allen-Bradley type EB	745-1457-00
R75	RESISTOR, FIXED, COMPOSITION: 47 ohms $\pm 10\%$ , 1/2 w; Allen-Bradley type EB	745-1296-00
R76	P/O Q Multiplier	
R77	P/O Q Multiplier	
R78	RESISTOR, FIXED, COMPOSITION: same as R74	745-1457-00
R79	RESISTOR, FIXED, COMPOSITION: same as R2	745-1422-00
R80	P/O BFO (L10)	
R81	RESISTOR, VARIABLE: 100,000 ohms $\pm 30\%$ , 1/4 w (includes S13); Allen-Bradley type CB	376-2530-00
R82	RESISTOR, FIXED, COMPOSITION: 27,000 ohms $\pm 10\%$ , 1/2 w; Allen-Bradley type EB	745-1412-00
R83	RESISTOR, FIXED, COMPOSITION: 39,000 ohms $\pm 10\%$ , 1/2 w; Allen-Bradley type EB	745-1419-00
R84	RESISTOR, FIXED, COMPOSITION: 10,000 ohms $\pm 10\%$ , 1/2 w; Allen-Bradley type EB	745-1394-00
R85	RESISTOR, FIXED, COMPOSITION: same as R84	745-1394-00
R86	RESISTOR, FIXED, COMPOSITION: same as R3	745-1352-00
R87	RESISTOR, FIXED, COMPOSITION: same as R75	745-1296-00
S1A	SWITCH, ROTARY: 1 circuit, 14 position, 1 section; 1 moving, 16 fixed contacts; Oak Mfg. Co. part no. 91873-OK1	259-0981-00
S1B	SWITCH SECTION, ROTARY: 1 circuit (1 pole) 14 position, 1 moving, 16 fixed contacts (p/o 755-3A only); Oak Mfg. Co. type CK	269-1977-00
S2	SWITCH SECTION, ROTARY: 1 circuit, 14 position, 1 moving, 10 fixed contacts; Oak Mfg. Co. type CK	269-2027-00
S3	SWITCH SECTION, ROTARY: same as S2	269-2027-00
S4	SWITCH SECTION, ROTARY: same as S2	269-2027-00
S5	SWITCH SECTION, ROTARY: 1 section, 4 position, 3 circuit, 12 fixed, 3 moving contacts; Oak Mfg. Co. type F	259-0949-00
S6	P/O S11	
S7	SWITCH SECTION, ROTARY: 2 circuit (2 pole) 12 position, 2 moving, 11 fixed contacts; Oak Mfg. Co.	269-2309-00
S8	SWITCH SECTION, ROTARY: 2 circuit (2 pole) 12 position, 2 moving, 10 fixed contacts; Oak Mfg. Co. part no. 218156-F	269-2310-00
S9	SWITCH SECTION, ROTARY: 2 circuit (2 pole) 12 position, 2 moving, 9 fixed contacts; Oak Mfg. Co. type F	269-2311-00
S10	P/O Q Multiplier	
S11	SWITCH, ROTARY: 3 circuit (3 pole) 4 position, 3 moving, 14 fixed contacts (includes S6); Oak Mfg. Co. part no. 217828-52	259-1483-00
S12	SWITCH, ROTARY: 1 circuit (1 pole) 3 position, 1 moving, 4 fixed contacts; Grigsby Co., Inc. type 4 MLR	259-1491-00
S13	P/O R81	
S14	SWITCH, ROTARY: 1 circuit (1 pole) 2 position, 1 moving contact, 3 fixed contacts (p/o 755-3A only); Oak Mfg. Co. part no. 191774-23	259-0980-00
T1	TRANSFORMER, RADIO FREQUENCY: 3.4 to 30 mc; (includes C24, C26)	543-8120-002
T2	TRANSFORMER, RADIO FREQUENCY: 3.4 to 30 mc; (includes C44, C81)	543-8122-002
T3	TRANSFORMER AND COIL ASSEMBLY: 3.055 mc freq; 25/32 in. by 25/32 in. by 2.875 in. overall; Communications Coil part no. X-185-1A and X-185-1B	278-1721-00
T4	TRANSFORMER, INTERMEDIATE FREQUENCY: 440- to 470-kc frequency range; Communications Coil part no. X-083-1	278-0281-00
T5	TRANSFORMER, INTERMEDIATE FREQUENCY: same as T4	278-0281-00
T6	TRANSFORMER, INTERMEDIATE FREQUENCY: same as T4	278-0281-00
T7	TRANSFORMER, AUDIO FREQUENCY: pri 2500 ohms; sec. 500 ohms and 4 ohms (includes C35, C36); Stancor Electronics part no. 27232	667-0302-00
T8	TRANSFORMER, POWER: pri. 115 v, 50/60 cps, sec. no. 1, overall 220 v CT; sec. no. 2, 6.3 v (includes C103, C108); Stancor Electronics part no. 27868	662-0301-00
V1	ELECTRON TUBE: glass envelope; pentode; Radio Corp. of America part no. 6DC6	255-0226-00
V2	ELECTRON TUBE: same as V1	255-0226-00
V3	ELECTRON TUBE: miniature pentode; Radio Corp. of America part no. 6EA8	255-0379-00
V4	ELECTRON TUBE: same as V3	255-0379-00



# SECTION 6

## Parts List

ITEM	DESCRIPTION	COLLINS PART NUMBER
V5	ELECTRON TUBE: twin triode; Radio Corp. of America part no. 12AX7	255-0201-00
V6	ELECTRON TUBE: glass envelope; pentode; Radio Corp. of America part no. 6BA6	255-0185-00
V7	ELECTRON TUBE: same as V6	255-0185-00
V8	ELECTRON TUBE: same as V3	255-0379-00
V9	ELECTRON TUBE: same as V1	255-0226-00
V10	ELECTRON TUBE: duplex-diode-triode; Radio Corp. of America part no. 6AT6	255-0190-00
V11	ELECTRON TUBE: pentode; General Electric Co. part no. 6BF5	255-0330-00
W1	CABLE ASSEMBLY: 3 conductor no. 18 AWG, A. C. plug and power connector (P6)	544-3121-00
XDS1	LAMPHOLDER: for use with miniature bayonet bulb; 1-3/8 in. lg o/a; Micarta Fabrications, Inc. part no. DB718	262-1210-00
XF1	FUSEHOLDER: extractor post type; 125 v. 5 amp; accommodates 3AG cartridge fuse; Bussman Mfg. Co. part no. HKP1-16	265-1002-00
XV1	SOCKET, ELECTRON TUBE: 7-pin miniature; molded construction; low loss composition; 0.343 in. h, 0.812 in. w, 1.125 in. lg o/a dim., excl terminals; Elco Mfg. Co., Inc. part no. 241BC	220-1044-00
XV2	SOCKET, ELECTRON TUBE: same as XV1	220-1044-00
XV3	SOCKET, ELECTRON TUBE: 9-pin miniature; molded construction; low loss composition; Elco Mfg. Co., Inc. part no. 274BC	220-1054-00
XV4	SOCKET, ELECTRON TUBE: same as XV3	220-1054-00
XV5	SOCKET, ELECTRON TUBE: same as XV3	220-1054-00
XV6	SOCKET, ELECTRON TUBE: same as XV1	220-1044-00
XV7	SOCKET, ELECTRON TUBE: same as XV1	220-1044-00
XV8	SOCKET, ELECTRON TUBE: same as XV3	220-1054-00
XV9	SOCKET, ELECTRON TUBE: same as XV1	220-1044-00
XV10	SOCKET, ELECTRON TUBE: same as XV1	220-1044-00
XV11	SOCKET, ELECTRON TUBE: same as XV1	220-1044-00
Y1	CRYSTAL UNIT, QUARTZ: 6.555-mc crystal frequency; 3.4- to 3.6-mc operating frequency; Midland Mfg. Co. part no. MO 8728	290-8728-00
Y2	CRYSTAL UNIT, QUARTZ: 6.755-mc crystal frequency; 3.6- to 3.8-mc operating frequency; Midland Mfg. Co. part no. MO 8729	290-8729-00
Y3	CRYSTAL UNIT, QUARTZ: 6.955-mc crystal frequency; 3.8- to 4.0-mc operating frequency; Midland Mfg. Co. part no. MO 8730	290-8730-00
Y4	CRYSTAL UNIT, QUARTZ: 10.155-mc crystal frequency; 7.0- to 7.2-mc operating frequency; Midland Mfg. Co. part no. MO 8731	290-8731-00
Y5	CRYSTAL UNIT, QUARTZ: 10.355-mc crystal frequency; 7.2- to 7.4-mc operating frequency; Midland Mfg. Co. part no. MO 8732	290-8732-00
Y6	CRYSTAL UNIT, QUARTZ: 8.5775-mc crystal frequency; 14.0- to 14.2-mc operating frequency; Midland Mfg. Co. part no. MO 8733	290-8733-00
Y7	CRYSTAL UNIT, QUARTZ: 8.6775-mc crystal frequency; 14.2- to 14.4-mc operating frequency; Midland Mfg. Co. part no. MO 8734	290-8734-00
Y8	CRYSTAL UNIT, QUARTZ: 8.9775-mc crystal frequency; 14.8- to 15.0-mc operating frequency; Midland Mfg. Co. part no. MO 8735	290-8735-00
Y9	CRYSTAL UNIT, QUARTZ: 12.0775-mc crystal frequency; 21.0- to 21.2-mc operating frequency; Midland Mfg. Co. part no. MO 8736	290-8736-00
Y10	CRYSTAL UNIT, QUARTZ: 12.1775-mc crystal frequency; 21.2- to 21.4-mc operating frequency; Midland Mfg. Co. part no. MO 8737	290-8737-00
Y11	CRYSTAL UNIT, QUARTZ: 12.2775-mc crystal frequency; 21.4- to 21.6-mc operating frequency; Midland Mfg. Co. part no. MO 8738	290-8738-00
Y12	CRYSTAL UNIT, QUARTZ: 15.8275-mc crystal frequency; 28.5- to 28.7-mc operating frequency; Midland Mfg. Co. part no. MO 8691	290-8691-00
Y13	NOT USED	

ITEM	DESCRIPTION	COLLINS PART NUMBER
Y14	NOT USED	
Y15	CRYSTAL UNIT, QUARTZ: 453.650-kc frequency; Midland Mfg. Co. part no. MO 8705	290-8705-00
Y16	CRYSTAL UNIT, QUARTZ: 456.350-kc frequency; Midland Mfg. Co. part no. MO 8706	290-8706-00
Y17	CRYSTAL UNIT, QUARTZ: 100.000-kc frequency; Bailey Electric Co.	290-8454-00
70K-2 OSCILLATOR		522-1093-00
*C301	CAPACITOR, FIXED, CERAMIC: 20 uuf $\pm 20\%$ , 500 v d-c; Centralab part no. DA933-051	913-2879-00
*C301	CAPACITOR, FIXED, CERAMIC: 20 uuf $\pm 20\%$ , 500 v d-c; Centralab part no. DA933-050	913-2880-00
*C301	CAPACITOR, FIXED, CERAMIC: 20 uuf $\pm 20\%$ , 500 v d-c; Centralab part no. DA933-049	913-2881-00
*C301	CAPACITOR, FIXED, CERAMIC: 20 uuf $\pm 20\%$ , 500 v d-c; Centralab part no. DA933-048	913-2882-00
*C301	CAPACITOR, FIXED, CERAMIC: 20 uuf $\pm 20\%$ , 500 v d-c; Centralab part no. DA934-042	913-2883-00
*C301	CAPACITOR, FIXED, CERAMIC: 20 uuf $\pm 20\%$ , 500 v d-c; Centralab part no. DA934-038	913-2884-00
*C301	CAPACITOR, FIXED, CERAMIC: 100 uuf $\pm 20\%$ , 500 v d-c; Centralab part no. DA931-022	913-2897-00
*C301	CAPACITOR, FIXED, CERAMIC: 100 uuf $\pm 20\%$ , 500 v d-c; Centralab part no. DA931-020	913-2898-00
*C301	CAPACITOR, FIXED, CERAMIC: 100 uuf $\pm 20\%$ , 500 v d-c; Centralab part no. DA932-008	913-2899-00
*C301	CAPACITOR, FIXED, CERAMIC: 100 uuf $\pm 20\%$ , 500 v d-c; Centralab part no. DA932-009	913-2900-00
C302	CAPACITOR, FIXED, MICA: 1000 uuf $\pm 1\%$ , 500 v d-c; Electro Motive part no. DM20F102F500WV	912-1749-00
C303	CAPACITOR, FIXED, MICA: 3000 uuf $\pm 10\%$ , 500 v d-c; Electro Motive part no. DM20F302F500WV	912-1748-00
C304	CAPACITOR, FIXED, MICA: 200 uuf $\pm 1\%$ , 300 v d-c; Electro Motive part no. DM15E201F300WV	912-3468-00
*C305	CAPACITOR, FIXED, CERAMIC: 100 uuf $\pm 2\%$ , 500 v d-c; Centralab part no. DA932-005	913-0074-00
*C305	CAPACITOR, FIXED, CERAMIC: 100 uuf $\pm 2\%$ , 500 v d-c; Centralab part no. DA933-017	913-0246-00
C306	CAPACITOR, FIXED, CERAMIC: 0.02 uf $\pm 60\%$ -40%, 250 v d-c; Sprague Electric Co. part no. 20C109	913-2097-00
C307	CAPACITOR, FIXED, CERAMIC: same as C306	917-1073-00
C308	CAPACITOR, VARIABLE, CERAMIC: 5.0 uuf min to 37.5 uuf max, 350 v d-c; Erie Resistor part no. 557018 COP0 39R	
C309	CAPACITOR, FIXED, CERAMIC: same as C306	913-2097-00
C310	CAPACITOR, FIXED, CERAMIC: same as C306	913-2097-00
CR301	DIODE: germanium; Sylvania part no. 1N34A	353-0103-00
L301	TRIMMER ASSEMBLY: Special	543-7323-00
L302	TRIMMER ASSEMBLY: same as L301	543-7323-00
L303	INDUCTOR, TUNING: Special	543-7333-00
L304	COIL, RADIO FREQUENCY: single layer wound, magnet wire, 3.30-uh inductance; Delevan Electronics	240-0695-00
R301	RESISTOR, COMPOSITION: 0.10 megohm $\pm 10\%$ , 1/2 w; Allen-Bradley type EB	745-1436-00
R302	RESISTOR, COMPOSITION: 82,000 ohms $\pm 10\%$ , 1/2 w; Allen-Bradley type EB	745-1433-00
R303	RESISTOR, COMPOSITION: same as R301	745-1436-00
T301	TRANSFORMER, RADIO FREQUENCY: pri. 380 uh nom, 790 kc; sec. 2.7 uh nom, 2.6 mc; Communication Coil	240-0665-00
V301	ELECTRON TUBE: type 6AU6; General Electric part no. 6AU6	255-0202-00

\*Select per operational requirement.

# section 6

## parts list

ITEM	DESCRIPTION	COLLINS PART NUMBER
	75S-3 RECEIVER	522-2562-00
	75S-3A RECEIVER	522-2664-00
C1	CAPACITOR, FIXED, MICA: 510 uuf $\pm 5\%$ , 300 v d-c; Electro Motive part no. DM15F511J-300WV	912-2867-00
C2	CAPACITOR, FIXED, MICA: same as C1	912-2867-00
C3	CAPACITOR, VARIABLE, CERAMIC: 8 to 75 uuf, 350 v d-c; Erie Resistor Corp. part no. 557018 U2P0 34R	917-1075-00
C4	CAPACITOR, FIXED, MICA: 240 uuf $\pm 5\%$ , 500 v d-c; Electro Motive part no. DM15F241J-500WV	912-2843-00
C5	CAPACITOR, VARIABLE, CERAMIC: same as C3	917-1075-00
C6	CAPACITOR, FIXED, MICA: 100 uuf $\pm 5\%$ , 500 v d-c; Electro Motive part no. DM15F101J-500WV	912-2816-00
C7	CAPACITOR, VARIABLE, CERAMIC: same as C3	917-1075-00
C8	CAPACITOR, FIXED, CERAMIC: 0.1 uf -20% +80%, 500 v d-c; Sprague Electric Co. part no. 41C92	913-3152-00
C9	CAPACITOR, VARIABLE, CERAMIC: 5 to 37.5 uuf, 350 v d-c; Erie Resistor Corp. part no. 557018 COP0 39R	917-1073-00
C10	CAPACITOR, VARIABLE, CERAMIC: same as C9	917-1073-00
C11	CAPACITOR, FIXED, CERAMIC: 1000 uuf +100% -20%, 500 v d-c; Erie Resistor Corp. part no. 851000 X5U0 102Z	913-3009-00
C12	CAPACITOR, FIXED, CERAMIC: 1.0 uuf $\pm 1/4$ uuf, 500 v d-c; Centralab	916-0070-00
C13	CAPACITOR, FIXED, CERAMIC: 10,000 uuf +100% -20%, 500 v d-c; Sprague of Wisc.	913-3013-00
C14	CAPACITOR, FIXED, CERAMIC: same as C11	913-3009-00
C15	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C16	CAPACITOR, VARIABLE, CERAMIC: same as C3	917-1075-00
C17	CAPACITOR, FIXED, MICA: 510 uuf $\pm 2\%$ , 300 v d-c; Electro Motive part no. DM15F511G300WV	912-2866-00
C18	CAPACITOR, VARIABLE, CERAMIC: same as C3	917-1075-00
C19	CAPACITOR, FIXED, MICA: 220 uuf $\pm 5\%$ , 500 v d-c; Electro Motive part no. DM15F221J500WV	912-2840-00
C20	CAPACITOR, VARIABLE, CERAMIC: same as C3	917-1075-00
C21	CAPACITOR, FIXED, MICA: 68 uuf $\pm 10\%$ , 500 v d-c; Electro Motive part no. DM15E680K500WV	912-2805-00
C22	CAPACITOR, VARIABLE, CERAMIC: same as C3	917-1075-00
C23	CAPACITOR, VARIABLE, CERAMIC: same as C9	917-1073-00
C24	P/O T1	
C25	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C26	P/O T1	
C27	CAPACITOR, FIXED, MICA: 15 uuf $\pm 10\%$ , 500 v d-c; Electro Motive part no. DM15C150K500WV	912-2760-00
C28	P/O L4	
C29	CAPACITOR, FIXED, ELECTROLYTIC: 8 uf -15% +100%, 6 v d-c; Sprague Electric part no. D26717	183-1167-00
C30	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C31	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C32	CAPACITOR, FIXED, CERAMIC: same as C11	913-3009-00
C33	CAPACITOR, FIXED, MICA: 220 uuf $\pm 10\%$ , 500 v d-c; Electro Motive part no. DM15F221K500WV	912-2841-00
C34	CAPACITOR, FIXED, CERAMIC: same as C11	913-3009-00
C35	P/O T7	
C36	P/O T7	
C37	CAPACITOR, FIXED, CERAMIC: same as C11	913-3009-00
C38	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C39	P/O L6	
C40	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C41	CAPACITOR, FIXED, MICA: 100 uuf $\pm 10\%$ , 500 v d-c; Electro Motive part no. DM15F101K500WV	912-2817-00
C42	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C43	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00

ITEM	DESCRIPTION	COLLINS PART NUMBER
C44	P/O T2	
C45	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C46	CAPACITOR, FIXED, MICA: 10 uuf $\pm 10\%$ , 500 v d-c; Electro Motive part no. DM15C100K500WV	912-2754-00
C47	NOT USED	
C48	CAPACITOR, FIXED, CERAMIC: same as C11	913-3009-00
C49	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C50	CAPACITOR, FIXED, PAPER: 0.05 uf $\pm 30\%$ -10%, 200 v d-c; Sangamo type 33	931-0163-00
C51	CAPACITOR, FIXED, CERAMIC: same as C11	013-3009-00
C52	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C53	CAPACITOR, FIXED, MICA: 470 uuf $\pm 10\%$ , 300 v d-c; Electro Motive part no. DM15F471K300WV	912-2865-00
C54	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C55	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C56	CAPACITOR, FIXED, ELECTROLYTIC: 100 uf -10% +75%, 6 v d-c; Sprague Electric part no. D28121	183-1782-00
C57	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C58	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C59	CAPACITOR, FIXED, ELECTROLYTIC: 3 sections, 40 uf each, -10% +40%, 150 v d-c; Sprague Electric part no. D27999	183-1701-00
C60	CAPACITOR, FIXED, ELECTROLYTIC: 40 uf -10% +100%, 150 v d-c; P. R. Mallory and Co., Inc. part no. TC48	183-1044-00
C61	CAPACITOR, VARIABLE, CERAMIC: same as C3	917-1075-00
C62	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C63	CAPACITOR, FIXED, MICA: same as C41	912-2817-00
C64	CAPACITOR, FIXED, MICA: same as C41	912-2817-00
C65	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C66	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C67	CAPACITOR, FIXED, MICA: 20 uuf $\pm 10\%$ , 500 v d-c; Electro Motive part no. DM15C200K500WV	912-2766-00
C68	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C69	CAPACITOR, VARIABLE, CERAMIC: same as C3	917-1075-00
C70	CAPACITOR, FIXED, MICA: 200 uuf $\pm 5\%$ , 500 v d-c; Electro Motive part no. DM15F201J500WV	912-2837-00
C71	CAPACITOR, VARIABLE, CERAMIC: same as C3	917-1075-00
C72	CAPACITOR, FIXED, MICA: 130 uuf $\pm 5\%$ , 500 v d-c; Electro Motive part no. DM15F131J500WV	912-2825-00
C73	CAPACITOR, VARIABLE, CERAMIC: same as C3	917-1075-00
C74	CAPACITOR, FIXED, MICA: same as C21	912-2805-00
C75	CAPACITOR, VARIABLE, CERAMIC: same as C3	917-1075-00
C76	CAPACITOR, VARIABLE, CERAMIC: same as C3	917-1075-00
C77	CAPACITOR, FIXED, CERAMIC: same as C11	913-3009-00
C78	CAPACITOR, FIXED, MICA: same as C27; used on 75S-3 only	912-2760-00
C79	CAPACITOR, FIXED, MICA: 47 uuf $\pm 10\%$ , 500 v d-c; Electro Motive part no. DM15E470K500WV	912-2793-00
C80	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C81	CAPACITOR, FIXED, MICA: same as C1: p'o T6	912-2867-00
C82	CAPACITOR, FIXED, MICA: same as C67	912-2766-00
C83	CAPACITOR, FIXED, MICA: 120 uuf $\pm 10\%$ , 500 v d-c; Electro Motive part no. DM15F121K500WV	912-2823-00
C84	CAPACITOR, FIXED, MICA: same as C53	912-2865-00
C85	NOT USED	
C86	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C87	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C88	NOT USED	
C89	CAPACITOR, FIXED, CERAMIC: same as C11	913-3013-00
C90	CAPACITOR, FIXED, CERAMIC: same as C11	913-3009-00
C91	P/O L4	
C92	CAPACITOR, FIXED, CERAMIC: 3 uuf $\pm 1/4$ uuf; 500 v d-c; Centralab	916-0144-00
C93	CAPACITOR, FIXED, MICA: same as C27	912-2760-00
C94	CAPACITOR, FIXED, MICA: same as C41	912-2817-00
C95	CAPACITOR, FIXED, MICA: same as C4	912-2843-00
C96	NOT USED	



## SECTION 6

## Parts List

ITEM	DESCRIPTION	COLLINS PART NUMBER
C97	CAPACITOR, FIXED, CERAMIC: same as C8	913-3152-00
C98	NOT USED	
C99	NOT USED	
C100	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C101	CAPACITOR, FIXED, CERAMIC: 10,000 uuf ±20%, 1000 v d-c; Centralab Div. of Globe Union, Inc. part no. DA134-048CB	913-3922-00
C102	CAPACITOR, FIXED, CERAMIC: 0.05 uf +80% -20%, 500 v d-c; Sprague Electric part no. 33C58 P O T8	913-3153-00
C103	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C104	CAPACITOR, FIXED, CERAMIC: same as C11	913-3009-00
C105	CAPACITOR, FIXED, MICA: same as C53	912-2865-00
C106	CAPACITOR, FIXED, ELECTROLYTIC: 10 uf -10% +100%, 150 v d-c; P. R. Mallory and Co., Inc. part no. TC42	183-1040-00
C108	P O T8	
C109	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C110	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C111	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C112	CAPACITOR, FIXED, CERAMIC: same as C101	913-3922-00
C113	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C114	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C115	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C116	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C117	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C118	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C119	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C120	CAPACITOR, FIXED, MICA: same as C27	912-2760-00
C121	CAPACITOR, FIXED, MICA: same as C41	912-2817-00
C122	CAPACITOR ASSEMBLY, VARIABLE, MICA: 7 uuf min, 60 uuf max, 350 v d-c; Electro Motive part no. T50410, capacitor; T16328, bracket (includes C126, C127)	918-0058-00 912-2811-00
C123	CAPACITOR ASSEMBLY: same as C122	918-0058-00
C124	CAPACITOR, FIXED, MICA: 82 uuf ±10%, 500 v d-c; Electro Motive part no. DM15E820K500WV	912-2781-00
C125	CAPACITOR, FIXED, MICA: 33 uuf ±10%, 500 v d-c; Electro Motive part no. DM15E330K500WV	912-2781-00
C126	P O C122	
C127	P O C122	
C128	CAPACITOR, FIXED, MICA: 33 uuf ±10%, 500 v d-c; Electro Motive part no. DM15E330K500WV	912-2799-00
C129	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C130	CAPACITOR, FIXED, CERAMIC: same as C11	913-3009-00
C131	CAPACITOR, FIXED, MICA: same as C128	912-2799-00
C132	P O Q Multiplier	
C133	P O Q Multiplier	
C134	P O Q Multiplier	
C135	CAPACITOR, FIXED, CERAMIC: same as C11	913-3009-00
C136	NOT USED	
C137	CAPACITOR, FIXED, PAPER: same as C50	931-0163-00
C138	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C139	NOT USED	
C140	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C141	CAPACITOR, FIXED, MICA: 180 uuf ±10%, 500 v d-c; Electro Motive part no. DM15F181K500WV	912-2835-00
C142	CAPACITOR, FIXED, MICA: same as C141	912-2835-00
C143	P O BFO (L10)	
C144	P O BFO (L10)	
C145	P O BFO (L10)	
C146	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C147	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C148	CAPACITOR, FIXED, MICA: same as C27	912-2760-00
CR1	SEMICONDUCTOR DEVICE, DIODE: silicon, axial lead mtd; metal and glass case, hermetically sealed; 400 v peak inverse voltage, General Electric part no. 1N1490	353-1659-00
CR2	SEMICONDUCTOR DEVICE, DIODE: same as CR1	353-1659-00
CR3	SEMICONDUCTOR DEVICE, DIODE: same as CR1	353-1659-00
CR4	P O BFO Assembly (L10)	
CR5	SEMICONDUCTOR DEVICE, DIODE: silicon, hermetically sealed; Hughes Aircraft	353-2762-00
DS1	LAMP, INCANDESCENT: 6.3 v, 0.15 amp, 1-1 8 in. lg, clear; General Electric part no. 47	262-3240-00
F1	FUSE, CARTRIDGE: 2 amp, 250 v d-c; ferrule terminal; Littlefuse Inc. part no. 312002	264-4070-00
FL1	FILTER, BAND PASS: 455.0-kc operating fre- quency, 300-cycle bandwidth; Midland Mfg. Co. part no. M3-0843	293-0843-00
FL2	FILTER, BAND PASS: 455.0-kc operating fre- quency, 454.30- to 455.70-kc bandwidth	526-9337-00
J1	JACK, TIP: accommodates 1/8 in. plug; ceramic insulation, brass contacts; Cinch Mfg. Corp. part no. 201-11-01-016	360-0088-00

ITEM	DESCRIPTION	COLLINS PART NUMBER
J2	JACK, TIP: same as J1	360-0088-00
J3	NOT USED	
J4	NOT USED	
J5	JACK, TIP: same as J1	360-0088-00
J6	JACK, TELEPHONE: spring leaf contacts, J1-1B contact arrangement; Switchcraft, Inc. part no. 13E	360-0136-00
L1	NOT USED	
L2	NOT USED	
L3	TRANSFORMER AND COIL ASSEMBLY: 3.055-mc frequency, 25/32 in. by 25/32 in. by 2.875 in. overall; Communications Coil part no. X-185-1A and X-185-1B	278-1721-00
L4	COIL, RADIO FREQUENCY: 10,000 uh, 66.5 ohms d-c resistance, 75 ma current, no. 22 AWG tinned copper leads (includes C28, C91); Delevan part no. 2500-76	240-2564-00
L5	COIL, RADIO FREQUENCY: single layer wound, 10-uh inductance; Jeffers Electronics, Div. of Speer Carbon Co. part no. 10102-32	240-0149-00
L6	REACTOR: 1 coil, 3.0-hy inductance, 0.120-amp current, 100 ohms resistance (includes C39); Chicago Standard Transformer Corp. part no. 11272	668-0020-00
L7	COIL, RADIO FREQUENCY: 1000 uh, 16 ohms d-c resistance, 135 ma current, 700 v rms; Delevan Electronics part no. 2500-28	240-2540-00
L8	TRANSFORMER, INTERMEDIATE FREQUENCY: 455 kc; 1-1/4 in. by 1-19/64 in. by 4-3/8 in.; Communications Coil Co. part no. X-565-1	278-0653-00
L9	TRANSFORMER, INTERMEDIATE FREQUENCY: 455 kc; 25/32 in. by 25/32 in. by 3 in. over-all dimensions; Communications Coil Co. part no. X-004-2	278-0277-00
L10	TRANSFORMER, RADIO FREQUENCY: 200 turns litz wire, 1/4 pi wound, 25/32 in. by 25/32 in. by 3 in. overall (includes C143, C144, C145, CR4 and R80); Communications Coil Co. part no. X-453-1	278-0655-00
L11	NOT USED	
L12	COIL, RADIO FREQUENCY: 500 uh, 11 ohms d-c resistance, 170 ma current, 700 v rms; Delevan Electronics part no. 2500-14	240-2533-00
L13	NOT USED	
L14	COIL, RADIO FREQUENCY: 3 pi wound, 225 turns ea. 2.0 mh, no. 40 AWG; Delevan Electronics part no. BS-123	240-0084-00
L15	COIL, RADIO FREQUENCY: same as L14	240-0084-00
L16	COIL, RADIO FREQUENCY: 100 uh, 3.2 ohms d-c resistance, 530 ma current, 700 v rms; Jeffers Electronics Div. of Speer Carbon Co. part no. 10404-34	240-0193-00
M1	VOLTMETER: panel, d-c; meter range 0-1 ma, 0-250 v, 50 scale divisions; Simpson Electric type 127B	458-0044-00
P1	DUMMY LOAD, ELECTRICAL: 100 ohms im- pedance, 1 2 w; 1 2 in. dia by 1.139 in. lg overall; (includes R41)	544-3143-002
P2	NOT USED	
P3		
P4		
P5	CABLE ASSEMBLY, SPECIAL PURPOSE, ELEC- TRICAL: 3 conductors no. 18 AWG; 125 v rms working voltage; 0.325 in. dia by 6 ft 0.843 in. lg o a, one end terminated w. plug connector; Belden Mfg. Co. KH3491	426-1464-00
P6	POWER CONNECTOR: 11 female contacts (see W1); Amphenol Borg part no. 78-S11M-1005	372-1952-00
R1	RESISTOR, FIXED, COMPOSITION: 3.3 megohms ±10%, 1 2 w; Allen-Bradley, type EB	745-1499-00
R2	RESISTOR, FIXED, COMPOSITION: 47,000 ohms ±10%, 1 2 w; Allen-Bradley type EB	745-1422-00
R3	RESISTOR, FIXED, COMPOSITION: 1000 ohms ±10%, 1 2 w; Allen-Bradley type EB	745-1352-00
R4	RESISTOR, FIXED, COMPOSITION: 0.22 megohm ±10%, 1 2 w; Allen-Bradley type EB	745-1450-00
R5	RESISTOR, FIXED, COMPOSITION: same as R3	745-1352-00
R6	RESISTOR, FIXED, COMPOSITION: same as R3	745-1352-00
R7	RESISTOR, FIXED, COMPOSITION: 68,000 ohms ±10%, 1 2 w; Allen-Bradley type EB	745-1429-00
R8	RESISTOR, FIXED, COMPOSITION: 68,000 ohms ±10%, 1 2 w; Allen-Bradley type EB	745-1303-00
R9	RESISTOR, FIXED, COMPOSITION: same as R3	745-1352-00
R10	RESISTOR, FIXED, COMPOSITION: same as R3	745-1352-00
R11	RESISTOR, FIXED, COMPOSITION: 0.10 megohm ±10%, 1 2 w; Allen-Bradley type EB	745-1436-00
R12	RESISTOR, FIXED, COMPOSITION: same as R8	745-1303-00



## specifications

### 5.1 Frequency Coverage.

Both the 75S-3 and the 75S-3A Receivers are capable of receiving on any frequency within the range of 3.4 to 30.0 mc. Receiver coverage is in increments of 200 kc for each bandswitch setting. The 75S-3 is equipped with 14 crystal sockets, selectable from the front panel. The 75S-3A is equipped with 28 crystal

sockets, selectable from the front panel. With the 12 crystals furnished, both receivers provide complete coverage of 80 meters, 40 meters, 20 meters, 15 meters, WWV at 15 mc, and the 28.5- to 28.7-mc portion of the 10-meter band. Remaining crystal sockets may be used for additional 10-meter coverage. Other crystals may be substituted for those furnished to provide coverage at other frequencies throughout the range.

### 5.2 Equipment Characteristics.

Power requirements. . . . .	115 volts, 50 to 60 cps. Power consumption is approximately 90 watts. Power may be provided by an external supply which delivers 150 volts d-c at 125 ma and -70 volts d-c at 5 ma. Filament power may be a-c or d-c as follows: 6 to 7 volts at 5.5 amperes, 12 to 14 volts at 2.75 amperes, or 24 to 28 volts at 1.375 amperes.
Frequency range. . . . .	3.4 to 30.0 megacycles. With crystals furnished, bands are as follows: 3.4 to 3.6 mc, 3.6 to 3.8 mc, 3.8 to 4.0 mc, 7.0 to 7.2 mc, 7.2 to 7.4 mc, 14.0 to 14.2 mc, 14.2 to 14.4 mc, 14.8 to 15.0 mc, 21.0 to 21.2 mc, 21.2 to 21.4 mc, 21.4 to 21.6 mc, and 28.5 to 28.7 mc.
Mode . . . . .	Selectable single sideband, CW, or AM.
Sensitivity . . . . .	0.5 microvolt for 10-db signal-plus-noise to noise ratio in SSB mode.
Selectivity . . . . .	SSB: 2.1 kc at 6 db down, 4.2 kc at 60 db down. CW: 0.2 kc at 6 db down, 1.25 kc at 60 db down. AM: 4.5 kc at 6 db down, 25 kc at 60 db down.
Spurious response . . . . .	Image rejection better than 50 db. Internal spurious signals below one microvolt equivalent antenna input.
Frequency stability . . . . .	Within 100 cps after warmup.
Dial accuracy . . . . .	Better than one kc on any band after midband calibration.
S-meter calibration. . . . .	Approximately S-9 with 100-uv antenna input signal.
Audio output requirements. . . . .	Speaker: 3 to 4 ohms. Headphones: 500 ohms or higher.
Audio output level. . . . .	0.25 watt at afc threshold. 1.8 watts maximum.
Size . . . . .	7-3/4 in. high, 14-3/4 in. wide, 12-1/2 in. deep.
Weight. . . . .	20 pounds.

### 5.3 Tube, Fuse, Lamp, And Semiconductor Complement.

TABLE 5-1. TUBES, FUSES, LAMPS, AND SEMICONDUCTORS

SYMBOL	FUNCTION	TYPE	SYMBOL	FUNCTION	TYPE
V1	Crystal calibrator	6DC6	V9	AM detector, agc rectifier, audio amplifier	6AT6
V2	R-f amplifier	6DC6	V10	Audio output	6BF5
V3A	First mixer	6EA8	V11	Tunable BFO	6DC6
V3B	Crystal oscillator	6EA8	V301	VFO	6AU6
V4A	Second mixer	6EA8	CR1, CR2	Power rectifiers	1N1490
V4B	Cathode follower	6EA8	CR3	Bias rectifier	1N1490
V5	Q-multiplier	12AX7	CR4	BFO tuning	HC7004
V6	First i-f amplifier	6BA6	CR5	Voltage regulator	1N732
V7	Second i-f amplifier	6BA6	CR301	Switch	1N34A
V8A	Product detector	6EA8	DS1, DS2	Dial lamps	47
V8B	Crystal BFO	6EA8	F1	Power supply fuse	2 amp

### 5.4 Available Accessories.

TABLE 5-2. AVAILABLE ACCESSORIES

ITEM	FUNCTION	COLLINS PART NUMBER
312B-3 Speaker	Station speaker	522-1166-00
312B-4 Station Control	Speaker, phone patch, directional wattmeter, and station control switches.	522-1167-00
351E-1 Mounting Plate	Table mount for 75S-3/3A.	522-1479-00
351E-2 Mounting Plate	Table mount for 312B-4.	522-1480-00
351E-3 Mounting Plate	Table mount for 312B-3.	522-1481-00
351R-1 Rack Mount	Rack mount for 75S-3/3A.	522-2665-00
351R-2 Rack Mount	Rack mount for 312B-4.	522-2666-00
Extra crystals	Additional band coverage.	See Parts List.
F455Y-31 Filter	3.1-kc band-pass filter.	526-9338-00
F455Y-40 Filter	4.0-kc band-pass filter.	526-9339-00
F455Y-60 Filter	6.0-kc band-pass filter.	526-9340-00
Filter Installation Kit	Parts for filter installation.	549-5095-00

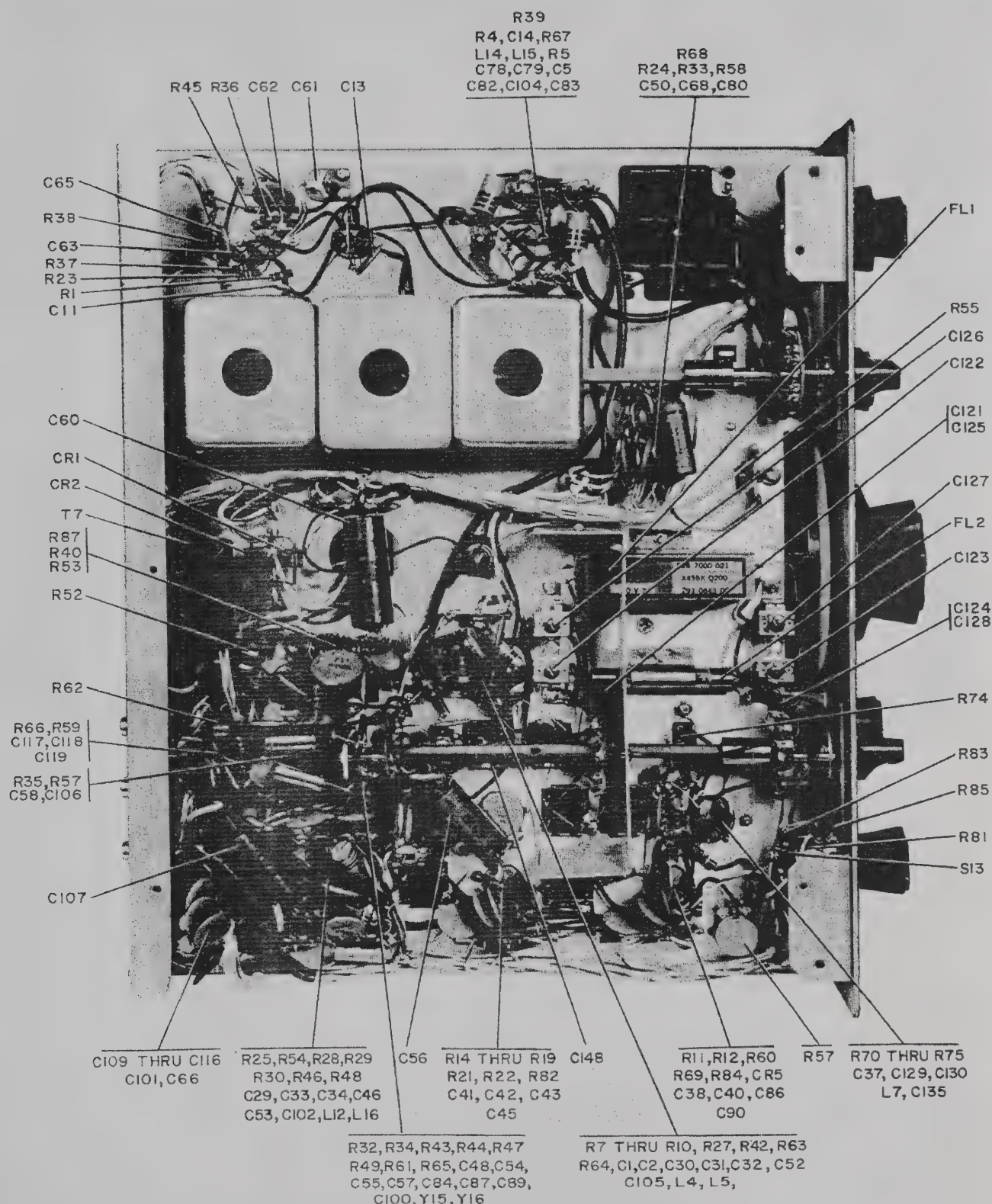


Figure 6-3. Bottom View, Parts Location





GENERAL COVERAGE CRYSTALS AVAILABLE									
CRYSTAL FREQUENCY (kc)	FOR OPERATING FREQUENCY (mc)	PART NUMBER	CRYSTAL FREQUENCY (kc)	FOR OPERATING FREQUENCY (mc)	PART NUMBER	CRYSTAL FREQUENCY (kc)	FOR OPERATING FREQUENCY (mc)	PART NUMBER	
6555.000	3.4-3.6	290-9009-00	8577.500	14.0-14.2	290-9062-00	12977.500	22.8-23.0	290-9106-00	
6755.000	3.6-3.8	290-9010-00	8652.500	14.15-14.35	290-9180-00	13077.500	23.0-23.2	290-9107-00	
6955.000	3.8-4.0	290-9011-00	8677.500	14.2-14.4	290-9063-00	13177.500	23.2-23.4	290-9108-00	
7155.000	4.0-4.2	290-9012-00	8777.500	14.4-14.6	290-9064-00	13277.500	23.4-23.6	290-9109-00	
7355.000	4.2-4.4	290-9013-00	8877.500	14.6-14.8	290-9065-00	13377.500	23.6-23.8	290-9110-00	
7555.000	4.4-4.6	290-9014-00	8977.500	14.8-15.0	290-9066-00	13477.500	23.8-24.0	290-9111-00	
7755.000	4.6-4.8	290-9015-00	9077.500	15.0-15.2	290-9067-00	13577.500	24.0-24.2	290-9112-00	
7955.000	4.8-5.0	290-9016-00	9177.500	15.2-15.4	290-9068-00	13677.500	24.2-24.4	290-9113-00	
9755.000	6.6-6.8	290-9025-00	9277.500	15.4-15.6	290-9069-00	13777.500	24.4-24.6	290-9114-00	
9955.000	6.8-7.0	290-9026-00	9377.500	15.6-15.8	290-9070-00	13877.500	24.6-24.8	290-9115-00	
10155.000	7.0-7.2	290-9027-00	9477.500	15.8-16.0	290-9071-00	13977.500	24.8-25.0	290-9116-00	
10355.000	7.2-7.4	290-9028-00	9577.500	16.0-16.2	290-9072-00	14077.500	25.0-25.2	290-9117-00	
10555.000	7.5-7.6	290-9029-00	9677.500	16.2-16.4	290-9073-00	14177.500	25.2-25.4	290-9118-00	
10755.000	7.4-7.6	290-9030-00	9777.500	16.4-16.6	290-9074-00	14277.500	25.4-25.6	290-9119-00	
10955.000	7.8-8.0	290-9031-00	9877.500	16.6-16.8	290-9075-00	14377.500	25.6-25.8	290-9120-00	
11155.000	8.0-8.2	290-9032-00	9977.500	16.8-17.0	290-9076-00	14477.500	25.8-26.0	290-9121-00	
11355.000	8.2-8.4	290-9033-00	10077.500	17.0-17.2	290-9077-00	14577.500	26.0-26.2	290-9122-00	
11555.000	8.4-8.6	290-9034-00	10177.500	17.2-17.4	290-9078-00	14677.500	26.2-26.4	290-9123-00	
11755.000	8.6-8.8	290-9035-00	10277.500	17.4-17.6	290-9079-00	14777.500	26.4-26.6	290-9124-00	
11955.000	8.8-9.0	290-9036-00	10377.500	17.6-17.8	290-9080-00	14877.500	26.6-26.8	290-9125-00	
12155.000	9.0-9.2	290-9037-00	10477.500	17.8-18.0	290-9081-00	14977.500	26.8-27.0	290-9126-00	
12355.000	9.2-9.4	290-9038-00	10577.500	18.0-18.2	290-9082-00	15077.500	27.0-27.2	290-9127-00	
12555.000	9.4-9.6	290-9039-00	10677.500	18.2-18.4	290-9083-00	15177.500	27.2-27.4	290-9128-00	
12755.000	9.6-9.8	290-9040-00	10777.500	18.4-18.6	290-9084-00	15277.500	27.4-27.6	290-9129-00	
12955.000	9.8-10.0	290-9041-00	10877.500	18.6-18.8	290-9085-00	15377.500	27.6-27.8	290-9130-00	
13155.000	10.0-10.2	290-9042-00	10977.500	18.8-19.0	290-9086-00	15477.500	27.8-28.0	290-9131-00	
13355.000	10.2-10.4	290-9043-00	11077.500	19.0-19.2	290-9087-00	15527.500	27.9-28.1	290-9132-00	
13555.000	10.4-10.6	290-9044-00	11177.500	19.2-19.4	290-9088-00	15577.500	28.0-28.2	290-9133-00	
13755.000	10.6-10.8	290-9045-00	11277.500	19.4-19.6	290-9089-00	15627.500	28.1-28.3	290-9134-00	
13955.000	10.8-11.0	290-9046-00	11377.500	19.6-19.8	290-9090-00	15677.500	28.2-28.4	290-9135-00	
14155.000	11.0-11.2	290-9047-00	11477.500	19.8-20.0	290-9091-00	15727.500	28.3-28.5	290-9136-00	
14355.000	11.2-11.4	290-9048-00	11577.500	20.0-20.2	290-9092-00	15777.500	28.4-28.6	290-9137-00	
14555.000	11.4-11.6	290-9049-00	11677.500	20.2-20.4	290-9093-00	15827.500	28.5-28.7	290-9138-00	
14755.000	11.6-11.8	290-9050-00	11777.500	20.4-20.6	290-9094-00	15877.500	28.6-28.8	290-9139-00	
14955.000	11.8-12.0	290-9051-00	11877.500	20.6-20.8	290-9095-00	15927.500	28.7-28.9	290-9140-00	
7577.500	12.0-12.2	290-9052-00	11977.500	20.8-21.0	290-9096-00	15977.500	28.8-29.0	290-9141-00	
7677.500	12.2-12.4	290-9053-00	12077.500	21.0-21.2	290-9097-00	16027.500	28.9-29.1	290-9142-00	
7777.500	12.4-12.6	290-9054-00	12177.500	21.2-21.4	290-9098-00	16077.500	29.0-29.2	290-9143-00	
7877.500	12.6-12.8	290-9055-00	12277.500	21.4-21.6	290-9099-00	16127.500	29.1-29.3	290-9144-00	
7977.500	12.8-13.0	290-9056-00	12377.500	21.6-21.8	290-9100-00	16177.500	29.2-29.4	290-9145-00	
8077.500	13.0-13.2	290-9057-00	12477.500	21.8-22.0	290-9101-00	16227.500	29.3-29.5	290-9146-00	
8177.500	13.2-13.4	290-9058-00	12577.500	22.0-22.2	290-9102-00	16277.500	29.4-29.6	290-9147-00	
8277.500	13.4-13.6	290-9059-00	12677.500	22.2-22.4	290-9103-00	16327.500	29.5-29.7	290-9148-00	
8377.500	13.6-13.8	290-9060-00	12777.500	22.4-22.6	290-9104-00	16377.500	29.6-29.8	290-9149-00	
8477.500	13.8-14.0	290-9061-00	12877.500	22.6-22.8	290-9105-00	16477.500	29.8-30.0	290-9150-00	

SECTION 6  
Parts List

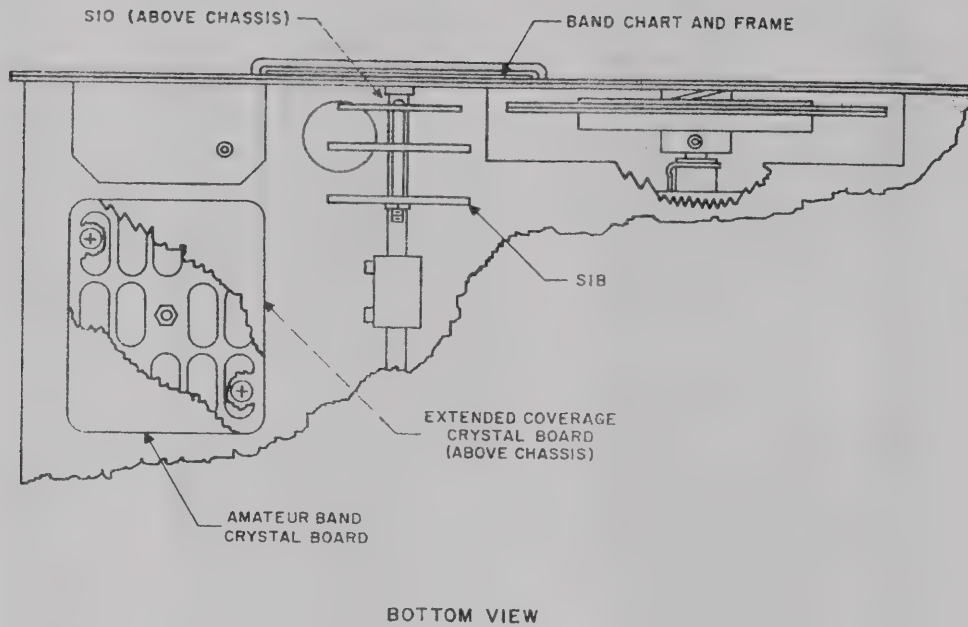


Figure 6-1. 75S-3A, Location of Added Components

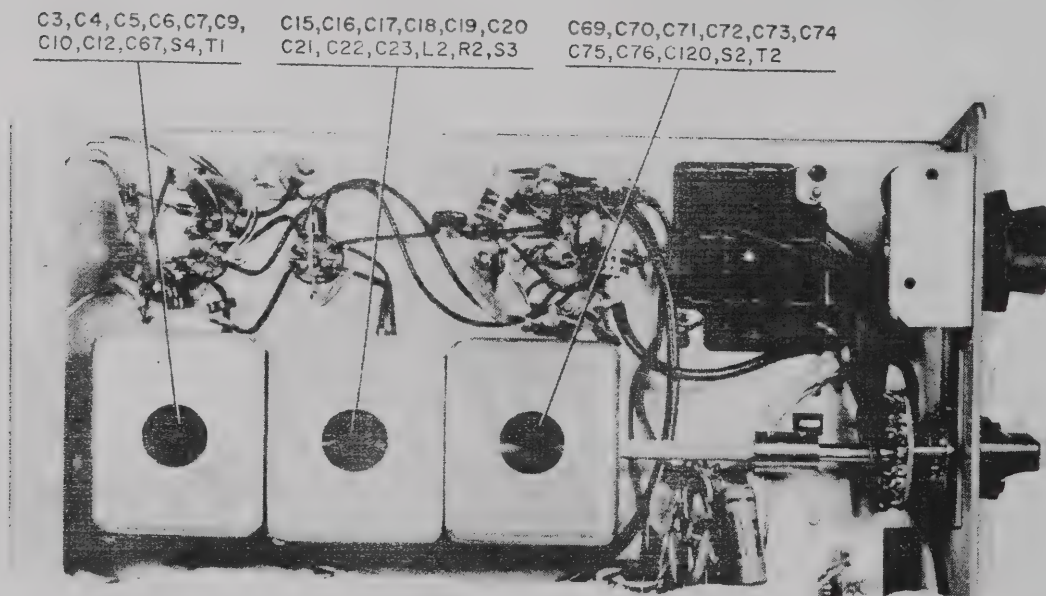


Figure 6-2. Bottom Right View, Parts Location



SECTION 6  
Parts List

ITEM	DESCRIPTION	COLLINS PART NUMBER
R13	RESISTOR, VARIABLE, COMPOSITION: 250 ohms ±30%, 0.2 w; Chicago Telephone type 70	376-4602-00
R14	RESISTOR, FIXED, COMPOSITION: same as R3	745-1352-00
R15	RESISTOR, FIXED, COMPOSITION: 15,000 ohms ±10%, 1 w; Allen-Bradley type GB	745-3401-00
R16	RESISTOR, FIXED, COMPOSITION: same as R2	745-1422-00
R17	RESISTOR, FIXED, COMPOSITION: 100 ohms ±10%, 1, 2 w; Allen-Bradley type EB	745-1310-00
R18	RESISTOR, FIXED, COMPOSITION: same as R3	745-1352-00
R19	RESISTOR, FIXED, COMPOSITION: same as R11	745-1436-00
R20	NOT USED	
R21	RESISTOR, FIXED, COMPOSITION: same as R8	745-1303-00
R22	RESISTOR, FIXED, COMPOSITION: same as R3	745-1352-00
R23	RESISTOR, FIXED, COMPOSITION: same as R4	745-1450-00
R24	RESISTOR, FIXED, COMPOSITION: same as R1	745-1499-00
R25	RESISTOR, FIXED, COMPOSITION: 5600 ohms ±10%, 1, 2 w; Allen-Bradley type EB	745-1384-00
R26	NOT USED	
R27	RESISTOR, FIXED, COMPOSITION: same as R17	745-1210-00
R28	RESISTOR, FIXED, COMPOSITION: same as R11	745-1436-00
R29	RESISTOR, FIXED, COMPOSITION: 6800 ohms ±10%, 1, 2 w; Allen-Bradley type EB	745-1387-00
R30	RESISTOR, FIXED, COMPOSITION: same as R2	745-1422-00
R31	RESISTOR, VARIABLE, COMPOSITION: 10,000 ohms ±30%, 1-4 w; (includes R56); Allen-Bradley type CB	376-2151-00
R32	RESISTOR, FIXED, COMPOSITION: 12,000 ohms ±10%, 1, 2 w; Allen-Bradley type EB	745-1398-00
R33	RESISTOR, FIXED, COMPOSITION: 330 ohms ±10%, 1, 2 w; Allen-Bradley type EB	745-1331-00
R34	RESISTOR, FIXED, COMPOSITION: same as R11	745-1436-00
R35	RESISTOR, FIXED, COMPOSITION: same as R4	745-1450-00
R36	RESISTOR, FIXED, COMPOSITION: 1.0 megohm ±10%, 1, 2 w; Allen-Bradley type EB	745-1478-00
R37	RESISTOR, FIXED, COMPOSITION: same as R4	745-1450-00
R38	RESISTOR, FIXED, COMPOSITION: same as R3	745-1352-00
R39	RESISTOR, FIXED, COMPOSITION: same as R11	745-1436-00
R40	RESISTOR, FIXED, COMPOSITION: same as R7	745-1429-00
R41	RESISTOR, FIXED, COMPOSITION: 100 ohms ±10%, 1, 2 w; p/o P1; Allen-Bradley type EB	745-1310-00
R42	RESISTOR, FIXED, COMPOSITION: 680 ohms ±10%, 1, 2 w; Allen-Bradley type EB	745-1345-00
R43	RESISTOR, FIXED, COMPOSITION: same as R11	745-1436-00
R44	RESISTOR, FIXED, COMPOSITION: same as R11	745-1436-00
R45	RESISTOR, FIXED, COMPOSITION: same as R3	745-1352-00
R46	RESISTOR, FIXED, COMPOSITION: same as R36	745-1478-00
R47	RESISTOR, FIXED, COMPOSITION: 1.5 megohms ±10%, 1, 2 w; Allen-Bradley type EB	745-1485-00
R48	RESISTOR, FIXED, COMPOSITION: same as R4	745-1450-00
R49	RESISTOR, FIXED, COMPOSITION: same as R3	745-1352-00
R50	RESISTOR, FIXED, COMPOSITION: 4700 ohms ±10%, 1, 2 w; Allen-Bradley type EB	745-1380-00
R51	RESISTOR, FIXED, COMPOSITION: 470 ohms ±10%, 2 w; Allen-Bradley type HB	745-5638-00
R52	RESISTOR, FIXED, COMPOSITION: 3900 ohms ±10%, 2 w; Allen-Bradley type HB	745-5677-00
R53	RESISTOR, FIXED, COMPOSITION: same as R2	745-1422-00
R54	RESISTOR, FIXED, COMPOSITION: 22,000 ohms ±10%, 1, 2 w; Allen-Bradley type EB	745-1408-00
R55	RESISTOR, FIXED, COMPOSITION: same as R32	745-1398-00
R56	P/O R31	
R57	RESISTOR, VARIABLE, COMPOSITION: 1000 ohms ±30%, 0.2 w; Chicago Telephone type 70	376-4601-00
R58	RESISTOR, FIXED, COMPOSITION: same as R32	745-1398-00
R59	RESISTOR, FIXED, COMPOSITION: 1000 ohms ±10%, 2 w; Allen-Bradley type HB	745-5652-00
R60	RESISTOR, FIXED, COMPOSITION: same as R11	745-1436-00
R61	RESISTOR, FIXED, COMPOSITION: 470 ohms ±10%, 1, 2 w; Allen-Bradley type EB	745-1338-00
R62	RESISTOR, FIXED, COMPOSITION: 10,000 ohms ±10%, 2 w; Allen-Bradley type HB	745-5694-00
R63	RESISTOR, FIXED, COMPOSITION: same as R36	745-1478-00
R64	RESISTOR, FIXED, COMPOSITION: same as R11	745-1436-00
R65	RESISTOR, FIXED, COMPOSITION: same as R36	745-1478-00
R66	RESISTOR, FIXED, COMPOSITION: same as R61	745-1338-00
R67	RESISTOR, FIXED, COMPOSITION: 1200 ohms ±10%, 1, 2 w; Allen-Bradley type EB	745-1356-00
R68	RESISTOR, FIXED, COMPOSITION: same as R50	745-1380-00
R69	RESISTOR, FIXED, COMPOSITION: same as R2	745-1422-00
R70	RESISTOR, FIXED, COMPOSITION: same as R11	745-1436-00
R71	RESISTOR, FIXED, COMPOSITION: same as R42	745-1345-00
R72	RESISTOR, FIXED, COMPOSITION: 120 ohms ±10%, 1, 2 w; Allen-Bradley type EB	745-1314-00
R73	RESISTOR, FIXED, COMPOSITION: same as R3	745-1352-00

ITEM	DESCRIPTION	COLLINS PART NUMBER
R74	RESISTOR, FIXED, COMPOSITION: 0.33 megohm ±10%, 1/2 w; Allen-Bradley type EB	745-1457-00
R75	RESISTOR, FIXED, COMPOSITION: 47 ohms ±10%, 1/2 w; Allen-Bradley type EB	745-1296-00
R76	P/O Q Multiplier	
R77	P/O Q Multiplier	
R78	RESISTOR, FIXED, COMPOSITION: same as R74	745-1457-00
R79	RESISTOR, FIXED, COMPOSITION: same as R2	745-1422-00
R80	P/O BFO (L10)	
R81	RESISTOR, VARIABLE: 100,000 ohms ±30%, 1/4 w (includes S13); Allen-Bradley type CB	376-2530-00
R82	RESISTOR, FIXED, COMPOSITION: 27,000 ohms ±10%, 1/2 w; Allen-Bradley type EB	745-1412-00
R83	RESISTOR, FIXED, COMPOSITION: 39,000 ohms ±10%, 1/2 w; Allen-Bradley type EB	745-1419-00
R84	RESISTOR, FIXED, COMPOSITION: 10,000 ohms ±10%, 1/2 w; Allen-Bradley type EB	745-1394-00
R85	RESISTOR, FIXED, COMPOSITION: same as R84	745-1394-00
R86	RESISTOR, FIXED, COMPOSITION: same as R3	745-1352-00
R87	RESISTOR, FIXED, COMPOSITION: same as R75	745-1296-00
S1A	SWITCH, ROTARY: 1 circuit, 14 position, 1 section; 1 moving, 16 fixed contacts; Oak Mfg. Co. part no. 91873-OK1	259-0981-00
S1B	SWITCH SECTION, ROTARY: 1 circuit (1 pole) 14 position, 1 moving, 16 fixed contacts (p/o 75S-3A only); Oak Mfg. Co. type CK	269-1977-00
S2	SWITCH SECTION, ROTARY: 1 circuit, 14 posi- tion, 1 moving, 10 fixed contacts; Oak Mfg. Co. type CK	269-2027-00
S3	SWITCH SECTION, ROTARY: same as S2	269-2027-00
S4	SWITCH SECTION, ROTARY: same as S2	269-2027-00
S5	SWITCH SECTION, ROTARY: 1 section, 4 position, 3 circuit, 12 fixed, 3 moving contacts; Oak Mfg. Co. type F	259-0949-00
S6	P/O S11	
S7	SWITCH SECTION, ROTARY: 2 circuit (2 pole) 12 position, 2 moving, 11 fixed contacts; Oak Mfg. Co.	269-2309-00
S8	SWITCH SECTION, ROTARY: 2 circuit (2 pole) 12 position, 2 moving, 10 fixed contacts; Oak Mfg. Co. part no. 218156-F	269-2310-00
S9	SWITCH SECTION, ROTARY: 2 circuit (2 pole) 12 position, 2 moving, 9 fixed contacts; Oak Mfg. Co. type F	269-2311-00
S10	P/O Q Multiplier	
S11	SWITCH, ROTARY: 3 circuit (3 pole) 4 position, 3 moving, 14 fixed contacts (includes S6); Oak Mfg. Co. part no. 217828-52	259-1483-00
S12	SWITCH, ROTARY: 1 circuit (1 pole) 3 position, 1 moving, 4 fixed contacts; Grigsby Co., Inc. type 4 MLR	259-1491-00
S13	P/O R81	
S14	SWITCH, ROTARY: 1 circuit (1 pole) 2 position, 1 moving contact, 3 fixed contacts (p/o 75S-3A only); Oak Mfg. Co. part no. 191774-23	259-0980-00
T1	TRANSFORMER, RADIO FREQUENCY: 3.4 to 30 mc; (includes C24, C26)	543-8120-002
T2	TRANSFORMER, RADIO FREQUENCY: 3.4 to 30 mc; (includes C44, C81)	543-8122-002
T3	TRANSFORMER AND COIL ASSEMBLY: 3.055 mc freq; 25/32 in. by 25/32 in. by 2.875 in. overall; Communications Coil part no. X-185-1A and X-185-1B	278-1721-00
T4	TRANSFORMER, INTERMEDIATE FREQUENCY: 440- to 470-kc frequency range; Communications Coil part no. X-083-1	278-0281-00
T5	TRANSFORMER, INTERMEDIATE FREQUENCY: same as T4	278-0281-00
T6	TRANSFORMER, INTERMEDIATE FREQUENCY: same as T4	278-0281-00
T7	TRANSFORMER, AUDIO FREQUENCY: pri 2500 ohms; sec. 500 ohms and 4 ohms (includes C35, C36); Stancor Electronics part no. 27232	667-0302-00
T8	TRANSFORMER, POWER: pri. 115 v, 50/60 cps, sec. no. 1, overall 220 v CT; sec. no. 2, 6.3 v (includes C103, C108); Stancor Electronics part no. 27868	662-0301-00
V1	ELECTRON TUBE: glass envelope; pentode; Radio Corp. of America part no. 6DC6	255-0226-00
V2	ELECTRON TUBE: same as V1	255-0226-00
V3	ELECTRON TUBE: miniature pentode; Radio Corp. of America part no. 6EA8	255-0379-00
V4	ELECTRON TUBE: same as V3	255-0379-00

# SECTION 6

## Parts List

ITEM	DESCRIPTION	COLLINS PART NUMBER
V5	ELECTRON TUBE: twin triode; Radio Corp. of America part no. 12AX7	255-0201-00
V6	ELECTRON TUBE: glass envelope; pentode; Radio Corp. of America part no. 6BA6	255-0185-00
V7	ELECTRON TUBE: same as V6	255-0185-00
V8	ELECTRON TUBE: same as V3	255-0379-00
V9	ELECTRON TUBE: same as V1	255-0226-00
V10	ELECTRON TUBE: duplex-diode-triode; Radio Corp. of America part no. 6AT6	255-0190-00
V11	ELECTRON TUBE: pentode; General Electric Co. part no. 6BF5	255-0330-00
W1	CABLE ASSEMBLY: 3 conductor no. 18 AWG, A. C. plug and power connector (P6)	544-3121-00
XDS1	LAMPHOLDER: for use with miniature bayonet bulb; 1-3/8 in. lg o/a; Micarta Fabrications, Inc. part no. DB718	262-1210-00
XF1	FUSEHOLDER: extractor post type; 125 v, 5 amp; accommodates 3AG cartridge fuse; Bussman Mfg. Co. part no. HKP1-16	265-1002-00
XV1	SOCKET, ELECTRON TUBE: 7-pin miniature; molded construction; low loss composition; 0.343 in. h, 0.812 in. w, 1.125 in. lg o/a dim., excl terminals; Elco Mfg. Co., Inc. part no. 241BC	220-1044-00
XV2	SOCKET, ELECTRON TUBE: same as XV1	220-1044-00
XV3	SOCKET, ELECTRON TUBE: 9-pin miniature; molded construction; low loss composition; Elco Mfg. Co., Inc. part no. 274BC	220-1054-00
XV4	SOCKET, ELECTRON TUBE: same as XV3	220-1054-00
XV5	SOCKET, ELECTRON TUBE: same as XV3	220-1054-00
XV6	SOCKET, ELECTRON TUBE: same as XV1	220-1044-00
XV7	SOCKET, ELECTRON TUBE: same as XV1	220-1044-00
XV8	SOCKET, ELECTRON TUBE: same as XV3	220-1054-00
XV9	SOCKET, ELECTRON TUBE: same as XV1	220-1044-00
XV10	SOCKET, ELECTRON TUBE: same as XV1	220-1044-00
XV11	SOCKET, ELECTRON TUBE: same as XV1	220-1044-00
Y1	CRYSTAL UNIT, QUARTZ: 6.555-mc crystal frequency; 3.4- to 3.6-mc operating frequency; Midland Mfg. Co. part no. MO 8728	290-8728-00
Y2	CRYSTAL UNIT, QUARTZ: 6.755-mc crystal frequency; 3.6- to 3.8-mc operating frequency; Midland Mfg. Co. part no. MO 8729	290-8729-00
Y3	CRYSTAL UNIT, QUARTZ: 6.955-mc crystal frequency; 3.8- to 4.0-mc operating frequency; Midland Mfg. Co. part no. MO 8730	290-8730-00
Y4	CRYSTAL UNIT, QUARTZ: 10.155-mc crystal frequency; 7.0- to 7.2-mc operating frequency; Midland Mfg. Co. part no. MO 8731	290-8731-00
Y5	CRYSTAL UNIT, QUARTZ: 10.355-mc crystal frequency; 7.2- to 7.4-mc operating frequency; Midland Mfg. Co. part no. MO 8732	290-8732-00
Y6	CRYSTAL UNIT, QUARTZ: 8.5775-mc crystal frequency; 14.0- to 14.2-mc operating frequency; Midland Mfg. Co. part no. MO 8733	290-8733-00
Y7	CRYSTAL UNIT, QUARTZ: 8.6775-mc crystal frequency; 14.2- to 14.4-mc operating frequency; Midland Mfg. Co. part no. MO 8734	290-8734-00
Y8	CRYSTAL UNIT, QUARTZ: 8.9775-mc crystal frequency; 14.8- to 15.0-mc operating frequency; Midland Mfg. Co. part no. MO 8735	290-8735-00
Y9	CRYSTAL UNIT, QUARTZ: 12.0775-mc crystal frequency; 21.0- to 21.2-mc operating frequency; Midland Mfg. Co. part no. MO 8736	290-8736-00
Y10	CRYSTAL UNIT, QUARTZ: 12.1775-mc crystal frequency; 21.2- to 21.4-mc operating frequency; Midland Mfg. Co. part no. MO 8737	290-8737-00
Y11	CRYSTAL UNIT, QUARTZ: 12.2775-mc crystal frequency; 21.4- to 21.6-mc operating frequency; Midland Mfg. Co. part no. MO 8738	290-8738-00
Y12	CRYSTAL UNIT, QUARTZ: 15.8275-mc crystal frequency; 28.5- to 28.7-mc operating frequency; Midland Mfg. Co. part no. MO 8691	290-8691-00
Y13	NOT USED	

ITEM	DESCRIPTION	COLLINS PART NUMBER
Y14	NOT USED	
Y15	CRYSTAL UNIT, QUARTZ: 453.650-kc frequency; Midland Mfg. Co. part no. MO 8705	290-8705-00
Y16	CRYSTAL UNIT, QUARTZ: 456.350-kc frequency; Midland Mfg. Co. part no. MO 8706	290-8706-00
Y17	CRYSTAL UNIT, QUARTZ: 100.000-kc frequency; Billey Electric Co.	290-8454-00
70K-2 OSCILLATOR		522-1093-00
*C301	CAPACITOR, FIXED, CERAMIC: 20 uuf $\pm 20\%$ , 500 v d-c; Centralab part no. DA933-051	913-2879-00
*C301	CAPACITOR, FIXED, CERAMIC: 20 uuf $\pm 20\%$ , 500 v d-c; Centralab part no. DA933-050	913-2880-00
*C301	CAPACITOR, FIXED, CERAMIC: 20 uuf $\pm 20\%$ , 500 v d-c; Centralab part no. DA933-049	913-2881-00
*C301	CAPACITOR, FIXED, CERAMIC: 20 uuf $\pm 20\%$ , 500 v d-c; Centralab part no. DA933-048	913-2882-00
*C301	CAPACITOR, FIXED, CERAMIC: 20 uuf $\pm 20\%$ , 500 v d-c; Centralab part no. DA933-047	913-2883-00
*C301	CAPACITOR, FIXED, CERAMIC: 20 uuf $\pm 20\%$ , 500 v d-c; Centralab part no. DA934-038	913-2884-00
*C301	CAPACITOR, FIXED, CERAMIC: 100 uuf $\pm 20\%$ , 500 v d-c; Centralab part no. DA931-022	913-2897-00
*C301	CAPACITOR, FIXED, CERAMIC: 100 uuf $\pm 20\%$ , 500 v d-c; Centralab part no. DA931-020	913-2898-00
*C301	CAPACITOR, FIXED, CERAMIC: 100 uuf $\pm 20\%$ , 500 v d-c; Centralab part no. DA932-008	913-2899-00
*C301	CAPACITOR, FIXED, CERAMIC: 100 uuf $\pm 20\%$ , 500 v d-c; Centralab part no. DA932-009	913-2900-00
C302	CAPACITOR, FIXED, MICA: 1000 uuf $\pm 1\%$ , 500 v d-c; Electro Motive part no. DM20F102F500WV	912-1749-00
C303	CAPACITOR, FIXED, MICA: 3000 uuf $\pm 10\%$ , 500 v d-c; Electro Motive part no. DM20F302F500WV	912-1748-00
C304	CAPACITOR, FIXED, MICA: 200 uuf $\pm 1\%$ , 300 v d-c; Electro Motive part no. DM15E201F300WV	912-3468-00
*C305	CAPACITOR, FIXED, CERAMIC: 100 uuf $\pm 2\%$ , 500 v d-c; Centralab part no. DA932-005	913-0074-00
*C305	CAPACITOR, FIXED, CERAMIC: 100 uuf $\pm 2\%$ , 500 v d-c; Centralab part no. DA933-017	913-0246-00
C306	CAPACITOR, FIXED, CERAMIC: 0.02 uf $\pm 60\%$ -40%, 250 v d-c; Sprague Electric Co. part no. 20C109	913-2097-00
C307	CAPACITOR, FIXED, CERAMIC: same as C306	917-1073-00
C308	CAPACITOR, VARIABLE, CERAMIC: 5.0 uuf min to 37.5 uuf max, 350 v d-c; Erie Resistor part no. 557018 COP0 39R	
C309	CAPACITOR, FIXED, CERAMIC: same as C306	913-2097-00
C310	CAPACITOR, FIXED, CERAMIC: same as C306	913-2097-00
CR301	DIODE: germanium; Sylvania part no. 1N34A	353-0103-00
L301	TRIMMER ASSEMBLY: Special	543-7323-00
L302	TRIMMER ASSEMBLY: same as L301	543-7323-00
L303	INDUCTOR, TUNING: Special	543-7333-00
L304	COIL, RADIO FREQUENCY: single layer wound, magnet wire, 3.30-uh inductance; Delevan Electronics	240-0695-00
R301	RESISTOR, COMPOSITION: 0.10 megohm $\pm 10\%$ , 1/2 w; Allen-Bradley type EB	745-1436-00
R302	RESISTOR, COMPOSITION: 82.000 ohms $\pm 10\%$ , 1/2 w; Allen-Bradley type EB	745-1433-00
R303	RESISTOR, COMPOSITION: same as R301	745-1436-00
T301	TRANSFORMER, RADIO FREQUENCY: pri. 380 uh nom, 790 kc; sec. 2.7 uh nom, 2.6 mc; Communication Coil	240-0665-00
V301	ELECTRON TUBE: type 6AU6; General Electric part no. 6AU6	255-0202-00

\*Select per operational requirement.



# section 6

## parts list

ITEM	DESCRIPTION	COLLINS PART NUMBER
	75S-3 RECEIVER	522-2562-00
	75S-3A RECEIVER	522-2664-00
C1	CAPACITOR, FIXED, MICA: 510 uuf $\pm 5\%$ , 300 v d-c; Electro Motive part no. DM15F511J-300WV	912-2867-00
C2	CAPACITOR, FIXED, MICA: same as C1	912-2867-00
C3	CAPACITOR, VARIABLE, CERAMIC: 8 to 75 uuf, 350 v d-c; Erie Resistor Corp. part no. 557018 U2P0 34R	917-1075-00
C4	CAPACITOR, FIXED, MICA: 240 uuf $\pm 5\%$ , 500 v d-c; Electro Motive part no. DM15F241J-500WV	912-2843-00
C5	CAPACITOR, VARIABLE, CERAMIC: same as C3	917-1075-00
C6	CAPACITOR, FIXED, MICA: 100 uuf $\pm 5\%$ , 500 v d-c; Electro Motive part no. DM15F101J-500WV	912-2816-00
C7	CAPACITOR, VARIABLE, CERAMIC: same as C3	917-1075-00
C8	CAPACITOR, FIXED, CERAMIC: 0.1 uf -20% +80%, 500 v d-c; Sprague Electric Co. part no. 41C92	913-3152-00
C9	CAPACITOR, VARIABLE, CERAMIC: 5 to 37.5 uuf, 350 v d-c; Erie Resistor Corp. part no. 557018 C0P0 39R	917-1073-00
C10	CAPACITOR, VARIABLE, CERAMIC: same as C9	917-1073-00
C11	CAPACITOR, FIXED, CERAMIC: 1000 uuf +100% -20%, 500 v d-c; Erie Resistor Corp. part no. 851000 X5U0 102Z	913-3009-00
C12	CAPACITOR, FIXED, CERAMIC: 1.0 uuf $\pm 1/4$ uuf, 500 v d-c; Centralab	916-0070-00
C13	CAPACITOR, FIXED, CERAMIC: 10,000 uuf +100% -20%, 500 v d-c; Sprague of Wisc.	913-3013-00
C14	CAPACITOR, FIXED, CERAMIC: same as C11	913-3009-00
C15	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C16	CAPACITOR, VARIABLE, CERAMIC: same as C3	917-1075-00
C17	CAPACITOR, FIXED, MICA: 510 uuf $\pm 2\%$ , 300 v d-c; Electro Motive part no. DM15F511G300WV	912-2866-00
C18	CAPACITOR, VARIABLE, CERAMIC: same as C3	917-1075-00
C19	CAPACITOR, FIXED, MICA: 220 uuf $\pm 5\%$ , 500 v d-c; Electro Motive part no. DM15F221J500WV	912-2840-00
C20	CAPACITOR, VARIABLE, CERAMIC: same as C3	917-1075-00
C21	CAPACITOR, FIXED, MICA: 68 uuf $\pm 10\%$ , 500 v d-c; Electro Motive part no. DM15E680K500WV	912-2805-00
C22	CAPACITOR, VARIABLE, CERAMIC: same as C3	917-1075-00
C23	CAPACITOR, VARIABLE, CERAMIC: same as C9	917-1073-00
C24	P/O T1	
C25	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C26	P/O T1	
C27	CAPACITOR, FIXED, MICA: 15 uuf $\pm 10\%$ , 500 v d-c; Electro Motive part no. DM15C150K500WV	912-2760-00
C28	P/O L4	
C29	CAPACITOR, FIXED, ELECTROLYTIC: 8 uf -15% +100%, 6 v d-c; Sprague Electric part no. D26717	183-1167-00
C30	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C31	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C32	CAPACITOR, FIXED, CERAMIC: same as C11	913-3009-00
C33	CAPACITOR, FIXED, MICA: 220 uuf $\pm 10\%$ , 500 v d-c; Electro Motive part no. DM15F221K500WV	912-2841-00
C34	CAPACITOR, FIXED, CERAMIC: same as C11	913-3009-00
C35	P/O T7	
C36	P/O T7	
C37	CAPACITOR, FIXED, CERAMIC: same as C11	913-3009-00
C38	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C39	P/O L6	
C40	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C41	CAPACITOR, FIXED, MICA: 100 uuf $\pm 10\%$ , 500 v d-c; Electro Motive part no. DM15F101K500WV	912-2817-00
C42	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C43	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00

ITEM	DESCRIPTION	COLLINS PART NUMBER
C44	P/O T2	
C45	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C46	CAPACITOR, FIXED, MICA: 10 uuf $\pm 10\%$ , 500 v d-c; Electro Motive part no. DM15C100K500WV	912-2754-00
C47	NOT USED	
C48	CAPACITOR, FIXED, CERAMIC: same as C11	913-3009-00
C49	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C50	CAPACITOR, FIXED, PAPER: 0.05 uf +30% -10%, 200 v d-c; Sangamo type 33	931-0163-00
C51	CAPACITOR, FIXED, CERAMIC: same as C11	913-3009-00
C52	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C53	CAPACITOR, FIXED, MICA: 470 uuf $\pm 10\%$ , 300 v d-c; Electro Motive part no. DM15F471K300WV	912-2865-00
C54	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C55	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C56	CAPACITOR, FIXED, ELECTROLYTIC: 100 uf -10% +75%, 6 v d-c; Sprague Electric part no. D28121	183-1782-00
C57	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C58	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C59	CAPACITOR, FIXED, ELECTROLYTIC: 3 sections, 40 uf each, -10% +40%, 150 v d-c; Sprague Electric part no. D27999	183-1701-00
C60	CAPACITOR, FIXED, ELECTROLYTIC: 40 uf -10% +100%, 150 v d-c; P. R. Mallory and Co., Inc. part no. TC48	183-1044-00
C61	CAPACITOR, VARIABLE, CERAMIC: same as C3	917-1075-00
C62	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C63	CAPACITOR, FIXED, MICA: same as C41	912-2817-00
C64	CAPACITOR, FIXED, MICA: same as C41	912-2817-00
C65	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C66	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C67	CAPACITOR, FIXED, MICA: 20 uuf $\pm 10\%$ , 500 v d-c; Electro Motive part no. DM15C200K500WV	912-2766-00
C68	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C69	CAPACITOR, VARIABLE, CERAMIC: same as C3	917-1075-00
C70	CAPACITOR, FIXED, MICA: 200 uuf $\pm 5\%$ , 500 v d-c; Electro Motive part no. DM15F201J500WV	912-2837-00
C71	CAPACITOR, VARIABLE, CERAMIC: same as C3	917-1075-00
C72	CAPACITOR, FIXED, MICA: 130 uuf $\pm 5\%$ , 500 v d-c; Electro Motive part no. DM15F131J500WV	912-2825-00
C73	CAPACITOR, VARIABLE, CERAMIC: same as C3	917-1075-00
C74	CAPACITOR, FIXED, MICA: same as C21	912-2805-00
C75	CAPACITOR, VARIABLE, CERAMIC: same as C3	917-1075-00
C76	CAPACITOR, VARIABLE, CERAMIC: same as C3	917-1075-00
C77	CAPACITOR, FIXED, CERAMIC: same as C11	913-3009-00
C78	CAPACITOR, FIXED, MICA: same as C27; used on 75S-3 only	912-2760-00
C79	CAPACITOR, FIXED, MICA: 47 uuf $\pm 10\%$ , 500 v d-c; Electro Motive part no. DM15E470K500WV	912-2793-00
C80	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C81	CAPACITOR, FIXED, MICA: same as C1; p/o T6	912-2867-00
C82	CAPACITOR, FIXED, MICA: same as C67	912-2766-00
C83	CAPACITOR, FIXED, MICA: 120 uuf $\pm 10\%$ , 500 v d-c; Electro Motive part no. DM15F121K500WV	912-2823-00
C84	CAPACITOR, FIXED, MICA: same as C33	912-2865-00
C85	NOT USED	
C86	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C87	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C88	NOT USED	
C89	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C90	CAPACITOR, FIXED, CERAMIC: same as C11	913-3009-00
C91	P/O L4	
C92	CAPACITOR, FIXED, CERAMIC: 3 uuf $\pm 1/4$ uuf, 500 v d-c; Centralab	916-0144-00
C93	CAPACITOR, FIXED, MICA: same as C27	912-2760-00
C94	CAPACITOR, FIXED, MICA: same as C41	912-2817-00
C95	CAPACITOR, FIXED, MICA: same as C4	912-2843-00
C96	NOT USED	



# SECTION 6

## Parts List

ITEM	DESCRIPTION	COLLINS PART NUMBER
C97	CAPACITOR, FIXED, CERAMIC: same as C8	913-3152-00
C98	NOT USED	
C99	NOT USED	
C100	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C101	CAPACITOR, FIXED, CERAMIC: 10,000 uuf ±20%, 1000 v d-c; Centralab Div. of Globe Union, Inc. part no. DA134-048CB	913-3922-00
C102	CAPACITOR, FIXED, CERAMIC: 0.05 uf ±80% -20%, 500 v d-c; Sprague Electric part no. 33C58	913-3153-00
C103	P O T8	
C104	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C105	CAPACITOR, FIXED, CERAMIC: same as C11	913-3009-00
C106	CAPACITOR, FIXED, MICA: same as C53	912-2865-00
C107	CAPACITOR, FIXED, ELECTROLYTIC: 10 uf -10% +100%, 150 v d-c; P. R. Mallory and Co., Inc. part no. TC42	183-1040-00
C108	P. O T8	
C109	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C110	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C111	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C112	CAPACITOR, FIXED, CERAMIC: same as C101	913-3922-00
C113	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C114	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C115	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C116	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C117	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C118	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C119	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C120	CAPACITOR, FIXED, MICA: same as C27	912-2760-00
C121	CAPACITOR, FIXED, MICA: same as C41	912-2817-00
C122	CAPACITOR ASSEMBLY, VARIABLE, MICA: 7 uuf min. 60 uuf max, 350 v d-c; Electro Motive part no. T50410, capacitor; T16328, bracket (includes C126, C127)	918-0058-00
C123	CAPACITOR ASSEMBLY: same as C122	912-2811-00
C124	CAPACITOR, FIXED, MICA: 82 uuf ±10%, 500 v d-c; Electro Motive part no. DM15E820K500WV	912-2781-00
C125	CAPACITOR, FIXED, MICA: 33 uuf ±10%, 500 v d-c; Electro Motive part no. DM15E330K500WV	912-2799-00
C126	P O C122	
C127	P O C122	
C128	CAPACITOR, FIXED, MICA: 33 uuf ±10%, 500 v d-c; Electro Motive part no. DM15E560K500WV	913-3013-00
C129	CAPACITOR, FIXED, CERAMIC: same as C13	913-3009-00
C130	CAPACITOR, FIXED, CERAMIC: same as C11	912-2799-00
C131	CAPACITOR, FIXED, MICA: same as C128	
C132	P O Q Multiplier	
C133	P O Q Multiplier	
C134	P O Q Multiplier	
C135	CAPACITOR, FIXED, CERAMIC: same as C11	913-3009-00
C136	NOT USED	
C137	CAPACITOR, FIXED, PAPER: same as C50	931-0163-00
C138	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C139	NOT USED	
C140	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C141	CAPACITOR, FIXED, MICA: 180 uuf ±10%, 500 v d-c; Electro Motive part no. DM15F181K500WV	912-2835-00
C142	CAPACITOR, FIXED, MICA: same as C141	912-2835-00
C143	P O BFO (L10)	
C144	P O BFO (L10)	
C145	P O BFO (L10)	
C146	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C147	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C148	CAPACITOR, FIXED, MICA: same as C27	912-2760-00
CR1	SEMICONDUCTOR DEVICE, DIODE: silicon, axial lead mtd; metal and glass case, hermetically sealed; 400 v peak inverse voltage, General Electric part no. 1N1490	353-1659-00
CR2	SEMICONDUCTOR DEVICE, DIODE: same as CR1	353-1659-00
CR3	SEMICONDUCTOR DEVICE, DIODE: same as CR1	353-1659-00
CR4	P O BFO Assembly (L10)	
CR5	SEMICONDUCTOR DEVICE, DIODE: silicon, hermetically sealed, Hughes Aircraft	353-2762-00
DS1	LAMP, INCANDESCENT: 6.3 v, 0.15 amp, 1-1 8 in. lg. clear, General Electric part no. 47	262-3240-00
F1	FUSE, CARTRIDGE: 2 amp, 250 v d-c; ferrule terminal; Littlefuse Inc. part no. 312002	264-4070-00
FL1	FILTER, BAND PASS: 455.0-kc operating fre- quency, 300-cycle bandwidth; Midland Mfg. Co. part no. M3-0843	293-0843-00
FL2	FILTER, BAND PASS: 455.0-kc operating fre- quency, 454.30- to 455.70-kc bandwidth	526-9337-00
J1	JACK, TIP: accommodates 1/8 in. plug; ceramic insulation, brass contacts; Cinch Mfg. Corp. part no. 201-11-01-018	360-0088-00

ITEM	DESCRIPTION	COLLINS PART NUMBER
J2	JACK, TIP: same as J1	360-0088-00
J3	NOT USED	
J4	NOT USED	
J5	JACK, TIP: same as J1	360-0088-00
J6	JACK, TELEPHONE: spring leaf contacts, J1-1B contact arrangement; Switchcraft, Inc. part no. 13E	360-0136-00
L1	NOT USED	
L2	NOT USED	
L3	TRANSFORMER AND COIL ASSEMBLY: 3.055-mc frequency, 25/32 in. by 25/32 in. by 2.875 in. overall; Communications Coil part no. X-185-1A and X-185-1B	278-1721-00
L4	COIL, RADIO FREQUENCY: 10,000 uh, 66.5 ohms d-c; resistance, 75 ma current, no. 22 AWG tinned copper leads (includes C28, C91); Delevan part no. 2500-76	240-2564-00
L5	COIL, RADIO FREQUENCY: single layer wound, 10-uh inductance; Jeffers Electronics, Div. of Speer Carbon Co. part no. 10102-32	240-0149-00
L6	REACTOR: 1 coil, 3.0-hy inductance, 0.120-amp current, 100 ohms resistance (includes C39); Chicago Standard Transformer Corp. part no. 11272	668-0020-00
L7	COIL, RADIO FREQUENCY: 1000 uh, 16 ohms d-c resistance, 135 ma current, 700 v rms; Delevan Electronics part no. 2500-28	240-2540-00
L8	TRANSFORMER, INTERMEDIATE FREQUENCY: 455 kc; 1-1/4 in. by 1-19/64 in. by 4-3/8 in.; Communications Coil Co. part no. X-565-1	278-0653-00
L9	TRANSFORMER, INTERMEDIATE FREQUENCY: 455 kc; 25/32 in. by 25/32 in. by 3 in. over-all dimensions; Communications Coil Co. part no. X-004-2	278-0277-00
L10	TRANSFORMER, RADIO FREQUENCY: 200 turns litz wire, 1/4 pi wound, 25/32 in. by 25/32 in. by 3 in. overall (includes C143, C144, C145, CR4 and R80); Communications Coil Co. part no. X-453-1	278-0655-00
L11	NOT USED	
L12	COIL, RADIO FREQUENCY: 500 uh, 11 ohms d-c resistance, 170 ma current, 700 v rms; Delevan Electronics part no. 2500-14	240-2533-00
L13	NOT USED	
L14	COIL, RADIO FREQUENCY: 3 pi wound, 225 turns ea, 2.0 mh, no. 40 AWG; Delevan Electronics part no. BS-123	240-0084-00
L15	COIL, RADIO FREQUENCY: same as L14	240-0084-00
L16	COIL, RADIO FREQUENCY: 100 uh, 3.2 ohms d-c resistance, 530 ma current, 700 v rms; Jeffers Electronics Div. of Speer Carbon Co. part no. 10404-34	240-0193-00
M1	VOLTMETER: panel, d-c; meter range 0-1 ma, 0-250 v, 50 scale divisions; Simpson Electric type 127B	458-0044-00
P1	DUMMY LOAD, ELECTRICAL: 100 ohms im- pedance, 1 2 w; 1 2 in. dia by 1.139 in. lg overall; (includes R41)	544-3143-002
P2	NOT USED	
P3		
P4		
P5	CABLE ASSEMBLY, SPECIAL PURPOSE, ELEC- TRICAL: 3 conductors no. 18 AWG; 125 v rms working voltage; 0.325 in. dia by 6 ft 0.843 in. lg o a; one end terminated w. plug connector; Belden Mfg. Co. KH3491	426-1464-00
P6	POWER CONNECTOR: 11 female contacts (see WI); Amphenol Borg part no. 78-S11M-1005	372-1952-00
R1	RESISTOR, FIXED, COMPOSITION: 3.3 megohms ±10%, 1 2 w; Allen-Bradley, type EB	745-1499-00
R2	RESISTOR, FIXED, COMPOSITION: 47,000 ohms ±10%, 1 2 w; Allen-Bradley type EB	745-1422-00
R3	RESISTOR, FIXED, COMPOSITION: 1000 ohms ±10%, 1 2 w; Allen-Bradley type EB	745-1352-00
R4	RESISTOR, FIXED, COMPOSITION: 0.22 megohm ±10%, 1 2 w; Allen-Bradley type EB	745-1450-00
R5	RESISTOR, FIXED, COMPOSITION: same as R3	745-1352-00
R6	RESISTOR, FIXED, COMPOSITION: same as R3	745-1352-00
R7	RESISTOR, FIXED, COMPOSITION: 68,000 ohms ±10%, 1 2 w; Allen-Bradley type EB	745-1429-00
R8	RESISTOR, FIXED, COMPOSITION: 68,000 ohms ±10%, 1 2 w; Allen-Bradley type EB	745-1303-00
R9	RESISTOR, FIXED, COMPOSITION: same as R3	745-1352-00
R10	RESISTOR, FIXED, COMPOSITION: same as R3	745-1352-00
R11	RESISTOR, FIXED, COMPOSITION: 0.10 megohm ±10%, 1 2 w; Allen-Bradley type EB	745-1436-00
R12	RESISTOR, FIXED, COMPOSITION: same as R8	745-1303-00

## specifications

### 5.1 Frequency Coverage.

Both the 75S-3 and the 75S-3A Receivers are capable of receiving on any frequency within the range of 3.4 to 30.0 mc. Receiver coverage is in increments of 200 kc for each bandswitch setting. The 75S-3 is equipped with 14 crystal sockets, selectable from the front panel. The 75S-3A is equipped with 28 crystal

sockets, selectable from the front panel. With the 12 crystals furnished, both receivers provide complete coverage of 80 meters, 40 meters, 20 meters, 15 meters, WWV at 15 mc, and the 28.5- to 28.7-mc portion of the 10-meter band. Remaining crystal sockets may be used for additional 10-meter coverage. Other crystals may be substituted for those furnished to provide coverage at other frequencies throughout the range.

### 5.2 Equipment Characteristics.

Power requirements. . . . .	115 volts, 50 to 60 cps. Power consumption is approximately 90 watts. Power may be provided by an external supply which delivers 150 volts d-c at 125 ma and -70 volts d-c at 5 ma. Filament power may be a-c or d-c as follows: 6 to 7 volts at 5.5 amperes, 12 to 14 volts at 2.75 amperes, or 24 to 28 volts at 1.375 amperes.
Frequency range. . . . .	3.4 to 30.0 megacycles. With crystals furnished, bands are as follows: 3.4 to 3.6 mc, 3.6 to 3.8 mc, 3.8 to 4.0 mc, 7.0 to 7.2 mc, 7.2 to 7.4 mc, 14.0 to 14.2 mc, 14.2 to 14.4 mc, 14.8 to 15.0 mc, 21.0 to 21.2 mc, 21.2 to 21.4 mc, 21.4 to 21.6 mc, and 28.5 to 28.7 mc.
Mode . . . . .	Selectable single sideband, CW, or AM.
Sensitivity . . . . .	0.5 microvolt for 10-db signal-plus-noise to noise ratio in SSB mode.
Selectivity . . . . .	SSB: 2.1 kc at 6 db down, 4.2 kc at 60 db down. CW: 0.2 kc at 6 db down, 1.25 kc at 60 db down. AM: 4.5 kc at 6 db down, 25 kc at 60 db down.
Spurious response . . . . .	Image rejection better than 50 db. Internal spurious signals below one microvolt equivalent antenna input.
Frequency stability . . . . .	Within 100 cps after warmup.
Dial accuracy. . . . .	Better than one kc on any band after midband calibration.
S-meter calibration. . . . .	Approximately S-9 with 100-uv antenna input signal.
Audio output requirements. . . . .	Speaker: 3 to 4 ohms. Headphones: 500 ohms or higher.
Audio output level. . . . .	0.25 watt at agc threshold. 1.8 watts maximum.
Size . . . . .	7-3/4 in. high, 14-3/4 in. wide, 12-1/2 in. deep.
Weight. . . . .	20 pounds.

### 5.3 Tube, Fuse, Lamp, And Semiconductor Complement.

TABLE 5-1. TUBES, FUSES, LAMPS, AND SEMICONDUCTORS

SYMBOL	FUNCTION	TYPE	SYMBOL	FUNCTION	TYPE
V1	Crystal calibrator	6DC6	V9	AM detector, agc rectifier, audio amplifier	6AT6
V2	R-f amplifier	6DC6			
V3A	First mixer	6EA8	V10	Audio output	6BF5
V3B	Crystal oscillator	6EA8	V11	Tunable BFO	6DC6
V4A	Second mixer	6EA8	V301	VFO	6AU6
V4B	Cathode follower	6EA8	CR1, CR2	Power rectifiers	1N1490
V5	Q-multiplier	12AX7	CR3	Bias rectifier	1N1490
V6	First i-f amplifier	6BA6	CR4	BFO tuning	HC7004
V7	Second i-f amplifier	6BA6	CR5	Voltage regulator	1N732
V8A	Product detector	6EA8	CR301	Switch	1N34A
V8B	Crystal BFO	6EA8	DS1, DS2	Dial lamps	47
			F1	Power supply fuse	2 amp

### 5.4 Available Accessories.

TABLE 5-2. AVAILABLE ACCESSORIES

ITEM	FUNCTION	COLLINS PART NUMBER
312B-3 Speaker	Station speaker	522-1166-00
312B-4 Station Control	Speaker, phone patch, directional wattmeter, and station control switches.	522-1167-00
351E-1 Mounting Plate	Table mount for 75S-3/3A.	522-1479-00
351E-2 Mounting Plate	Table mount for 312B-4.	522-1480-00
351E-3 Mounting Plate	Table mount for 312B-3.	522-1481-00
351R-1 Rack Mount	Rack mount for 75S-3/3A.	522-2665-00
351R-2 Rack Mount	Rack mount for 312B-4.	522-2666-00
Extra crystals	Additional band coverage.	See Parts List.
F455Y-31 Filter	3.1-kc band-pass filter.	526-9338-00
F455Y-40 Filter	4.0-kc band-pass filter.	526-9339-00
F455Y-60 Filter	6.0-kc band-pass filter.	526-9340-00
Filter Installation Kit	Parts for filter installation.	549-5095-00





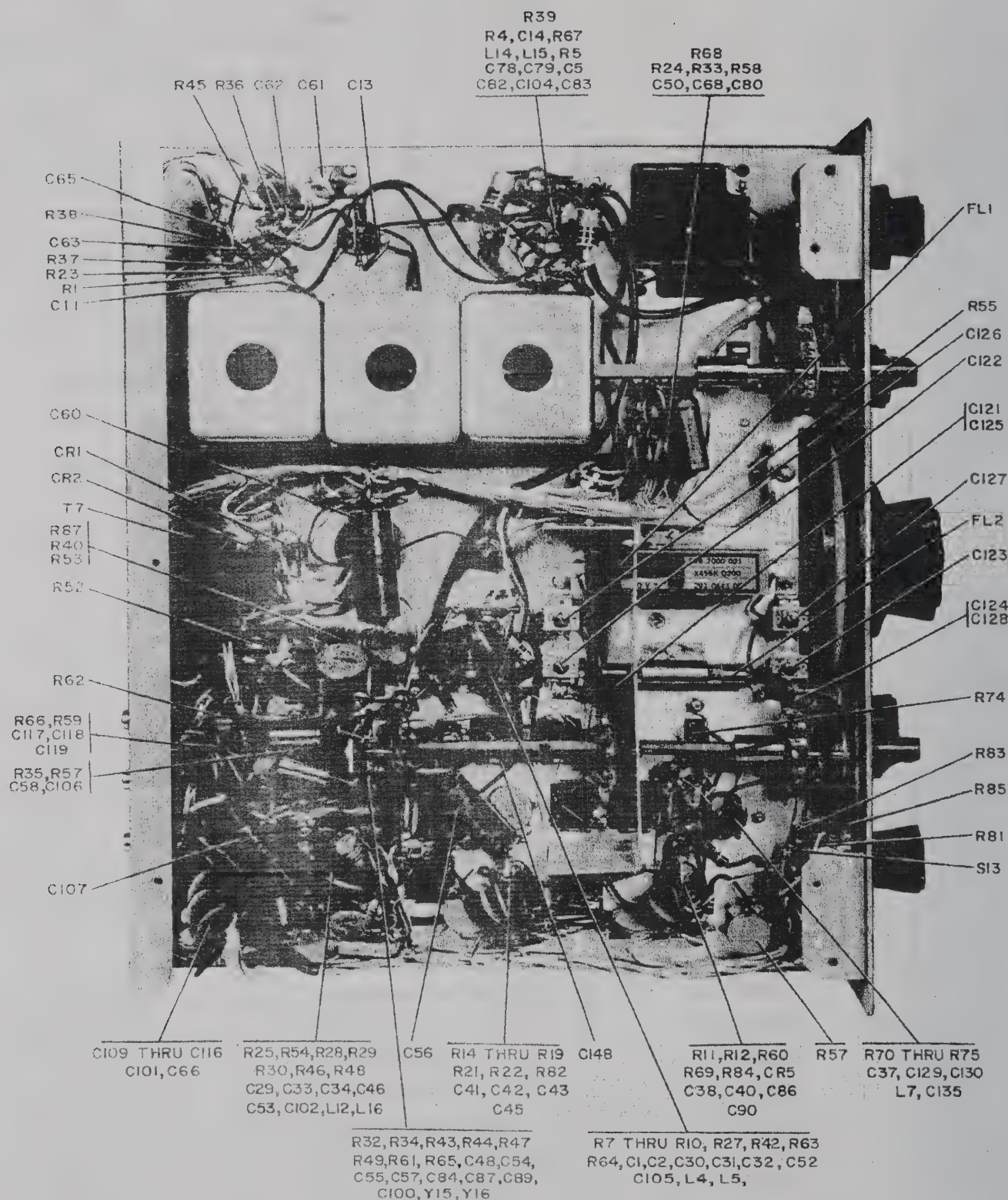


Figure 6-3. Bottom View, Parts Location





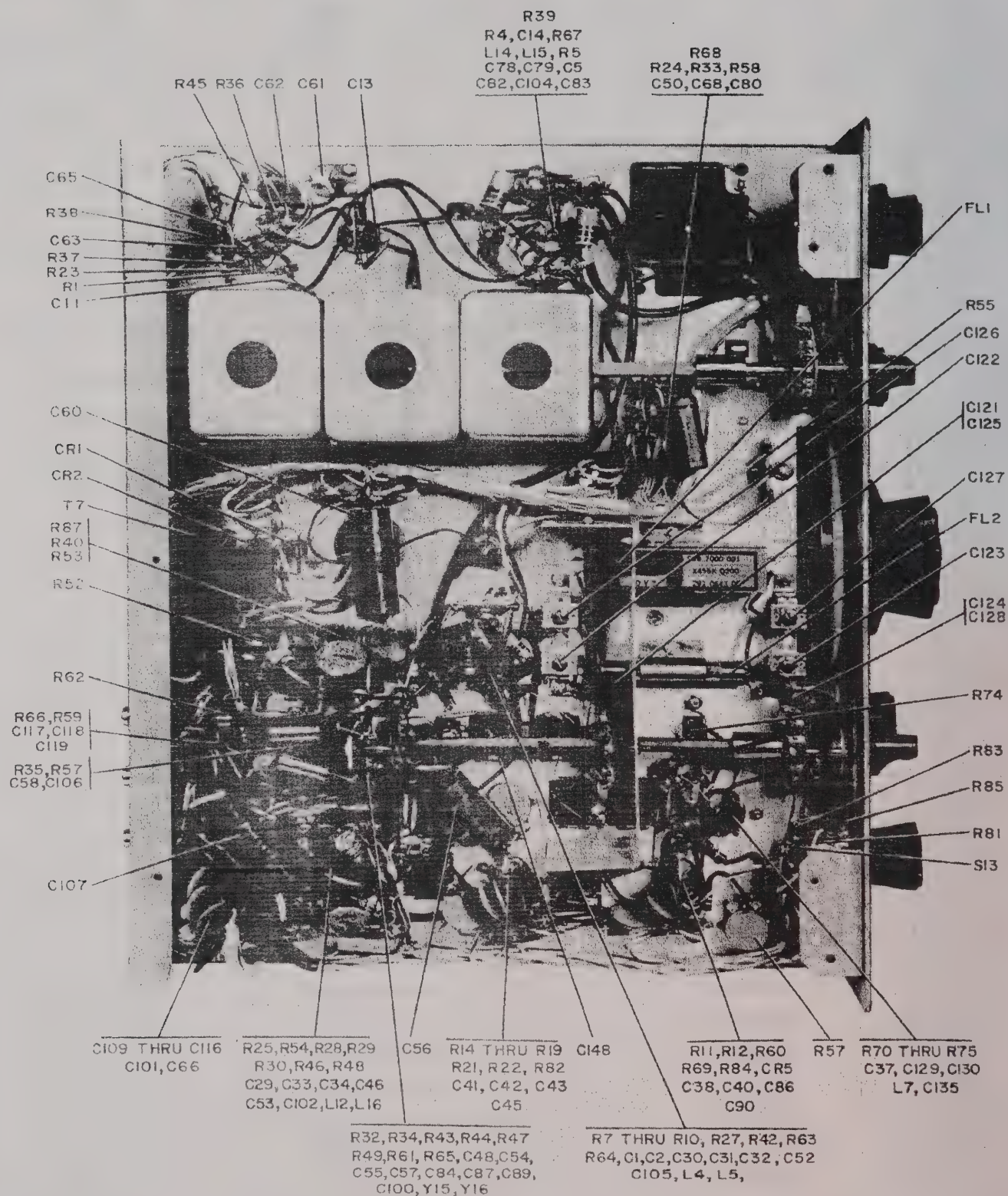
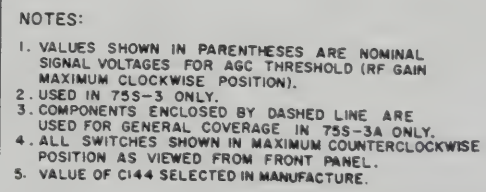


Figure 6-3. Bottom View, Parts Location

## 7



7-1/7-2



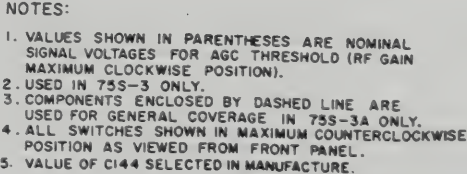
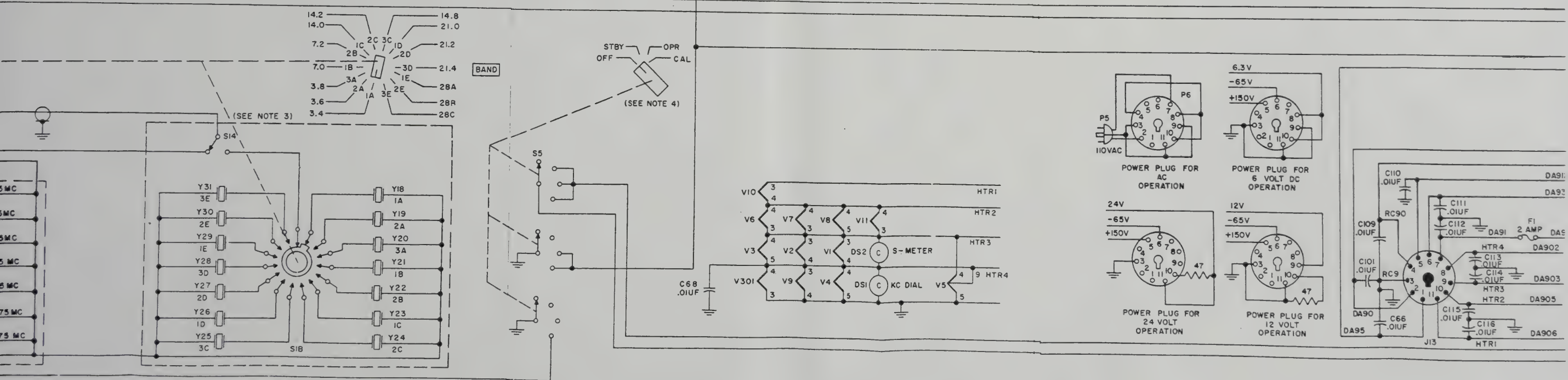
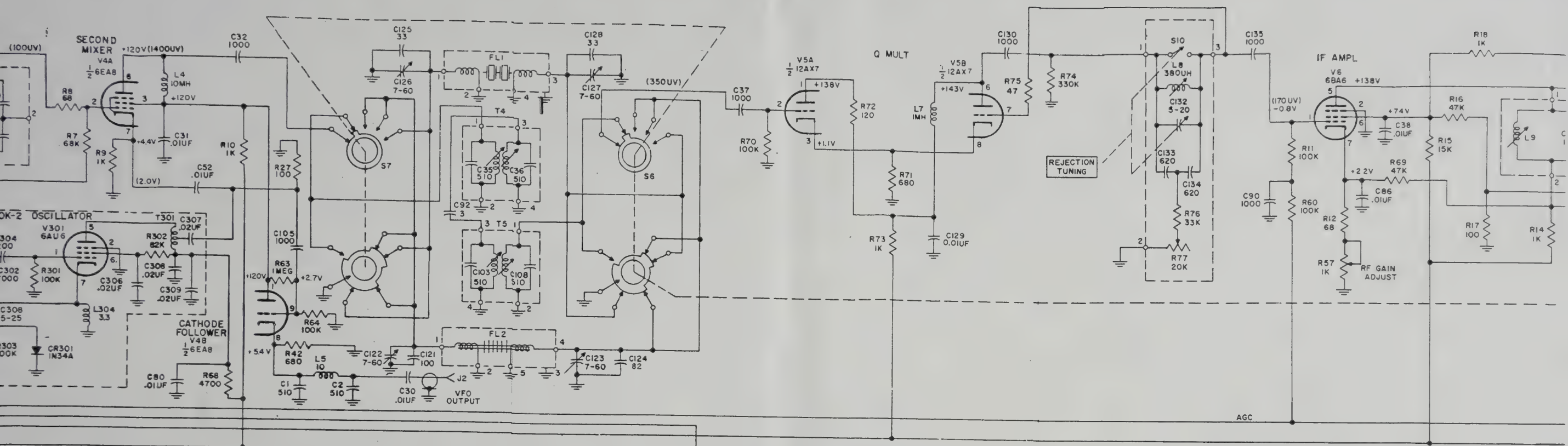
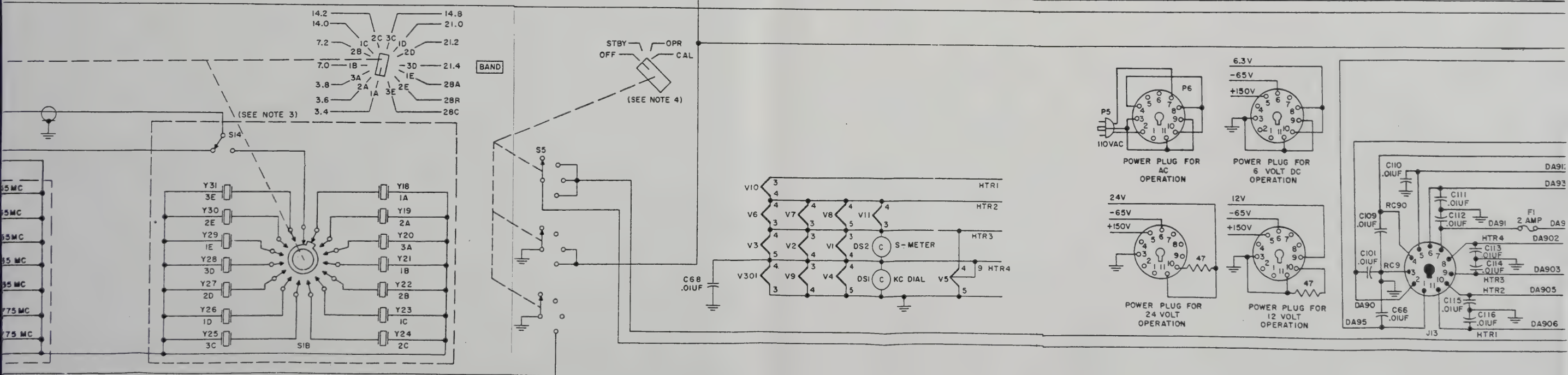
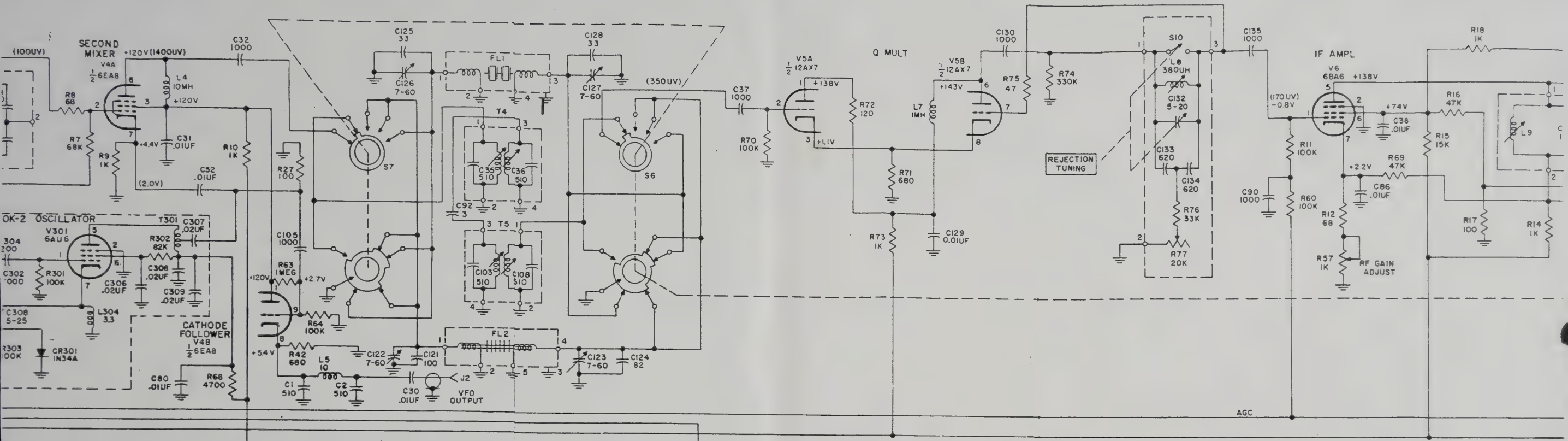


Figure 7-1. 75S-3 and 75S-3A, Schematic Diagram

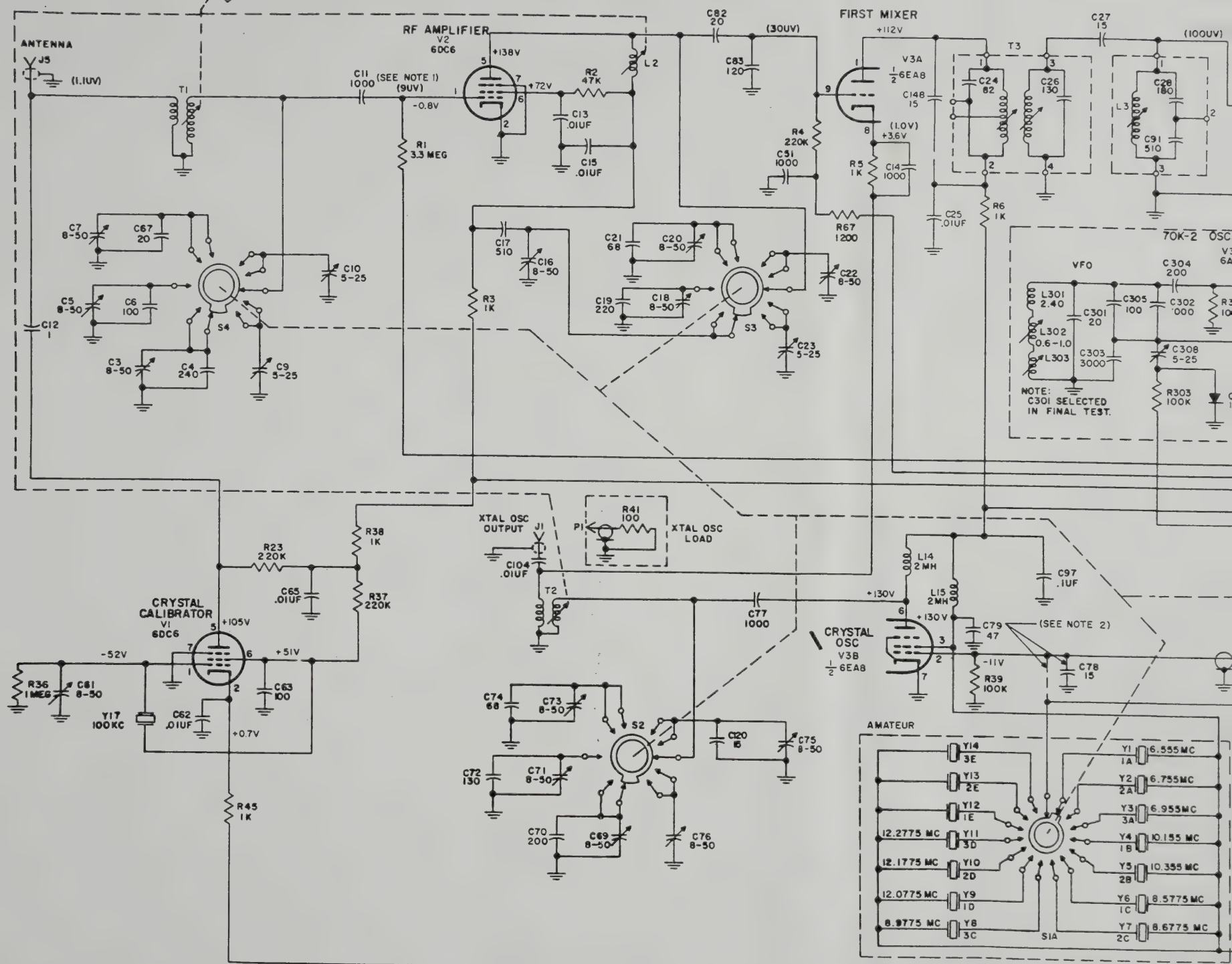




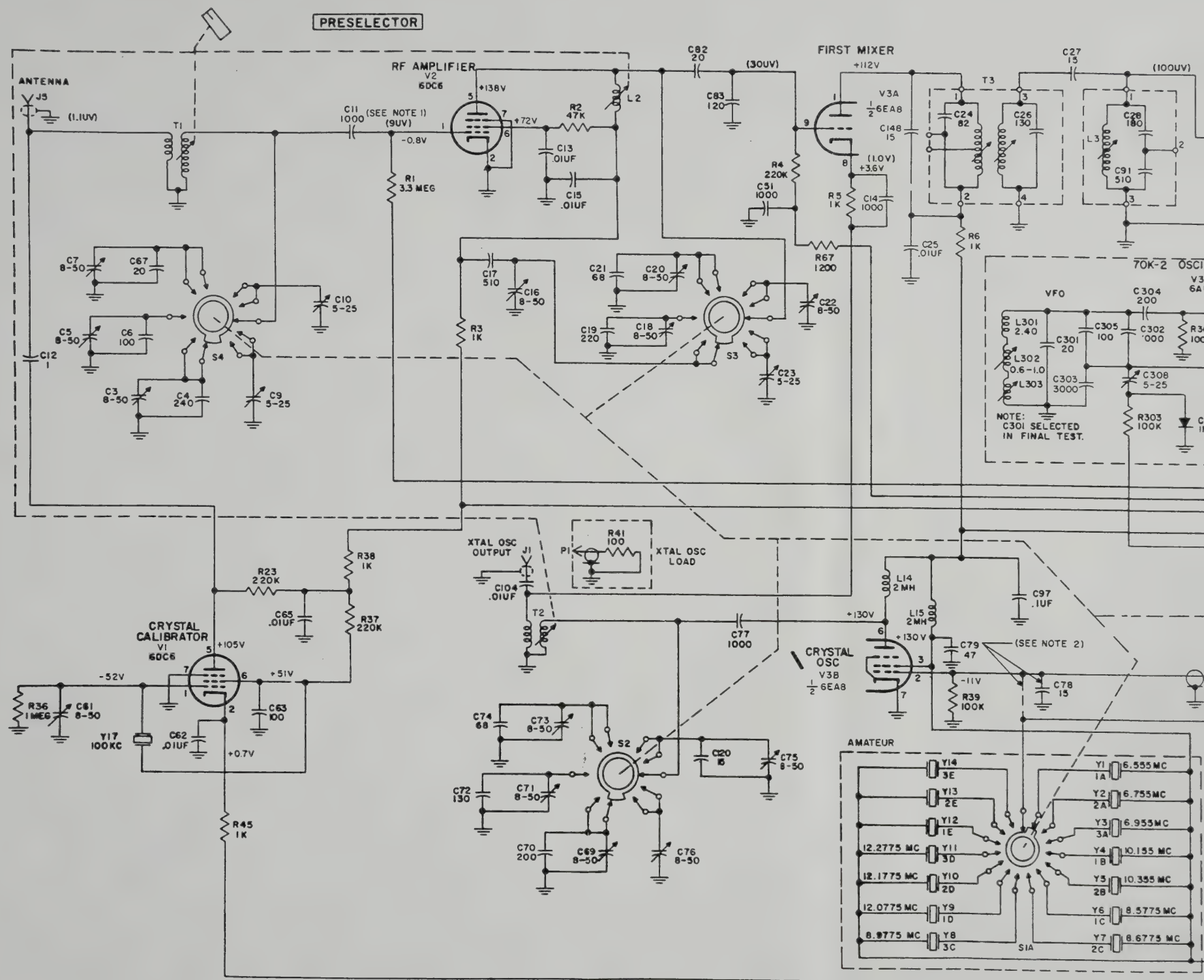




# PRESELECTOR







755-3  
755-3A

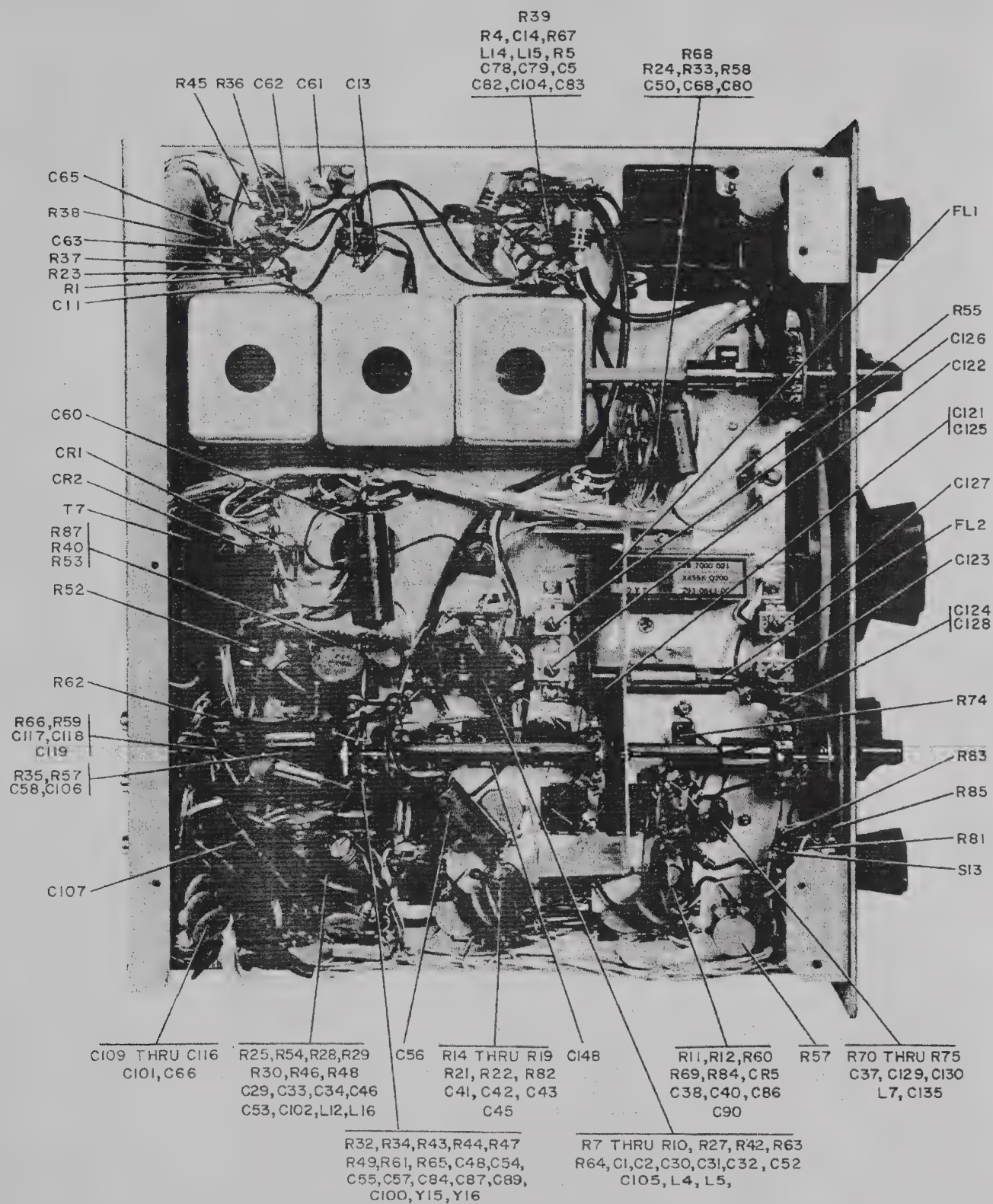


Figure 6-3. Bottom View, Parts Location





GENERAL COVERAGE CRYSTALS AVAILABLE								
CRYSTAL FREQUENCY (kc)	FOR OPERATING FREQUENCY (mc)	PART NUMBER	CRYSTAL FREQUENCY (kc)	FOR OPERATING FREQUENCY (mc)	PART NUMBER	CRYSTAL FREQUENCY (kc)	FOR OPERATING FREQUENCY (mc)	PART NUMBER
6555.000	3.4-3.6	290-9009-00	8577.500	14.0-14.2	290-9062-00	12977.500	22.8-23.0	290-9106-00
6755.000	3.6-3.8	290-9010-00	8652.500	14.15-14.35	290-9180-00	13077.500	23.0-23.2	290-9107-00
6955.000	3.8-4.0	290-9011-00	8677.500	14.2-14.4	290-9063-00	13177.500	23.2-23.4	290-9108-00
7155.000	4.0-4.2	290-9012-00	8777.500	14.4-14.6	290-9064-00	13277.500	23.4-23.6	290-9109-00
7355.000	4.2-4.4	290-9013-00	8877.500	14.6-14.8	290-9065-00	13377.500	23.6-23.8	290-9110-00
7555.000	4.4-4.6	290-9014-00	8977.500	14.8-15.0	290-9066-00	13477.500	23.8-24.0	290-9111-00
7755.000	4.6-4.8	290-9015-00	9077.500	15.0-15.2	290-9067-00	13577.500	24.0-24.2	290-9112-00
7955.000	4.8-5.0	290-9016-00	9177.500	15.2-15.4	290-9068-00	13677.500	24.2-24.4	290-9113-00
9755.000	6.6-6.8	290-9025-00	9277.500	15.4-15.6	290-9069-00	13777.500	24.4-24.6	290-9114-00
9955.000	6.8-7.0	290-9026-00	9377.500	15.6-15.8	290-9070-00	13877.500	24.6-24.8	290-9115-00
10155.000	7.0-7.2	290-9027-00	9477.500	15.8-16.0	290-9071-00	13977.500	24.8-25.0	290-9116-00
10355.000	7.2-7.4	290-9028-00	9577.500	16.0-16.2	290-9072-00	14077.500	25.0-25.2	290-9117-00
10555.000	7.5-7.6	290-9029-00	9677.500	16.2-16.4	290-9073-00	14177.500	25.2-25.4	290-9118-00
10755.000	7.4-7.6	290-9030-00	9777.500	16.4-16.6	290-9074-00	14277.500	25.4-25.6	290-9119-00
10955.000	7.8-8.0	290-9031-00	9877.500	16.6-16.8	290-9075-00	14377.500	25.6-25.8	290-9120-00
11155.000	8.0-8.2	290-9032-00	9977.500	16.8-17.0	290-9076-00	14477.500	25.8-26.0	290-9121-00
11355.000	8.2-8.4	290-9033-00	10077.500	17.0-17.2	290-9077-00	14577.500	26.0-26.2	290-9122-00
11555.000	8.4-8.6	290-9034-00	10177.500	17.2-17.4	290-9078-00	14677.500	26.2-26.4	290-9123-00
11755.000	8.6-8.8	290-9035-00	10277.500	17.4-17.6	290-9079-00	14777.500	26.4-26.6	290-9124-00
11955.000	8.8-9.0	290-9036-00	10377.500	17.6-17.8	290-9080-00	14877.500	26.6-26.8	290-9125-00
12155.000	9.0-9.2	290-9037-00	10477.500	17.8-18.0	290-9081-00	14977.500	26.8-27.0	290-9126-00
12355.000	9.2-9.4	290-9038-00	10577.500	18.0-18.2	290-9082-00	15077.500	27.0-27.2	290-9127-00
12555.000	9.4-9.6	290-9039-00	10677.500	18.2-18.4	290-9083-00	15177.500	27.2-27.4	290-9128-00
12755.000	9.6-9.8	290-9040-00	10777.500	18.4-18.6	290-9084-00	15277.500	27.4-27.6	290-9129-00
12955.000	9.8-10.0	290-9041-00	10877.500	18.6-18.8	290-9085-00	15377.500	27.6-27.8	290-9130-00
13155.000	10.0-10.2	290-9042-00	10977.500	18.8-19.0	290-9086-00	15477.500	27.8-28.0	290-9131-00
13355.000	10.2-10.4	290-9043-00	11077.500	19.0-19.2	290-9087-00	15527.500	27.9-28.1	290-9142-00
13555.000	10.4-10.6	290-9044-00	11177.500	19.2-19.4	290-9088-00	15577.500	28.0-28.2	290-9132-00
13755.000	10.6-10.8	290-9045-00	11277.500	19.4-19.6	290-9089-00	15627.500	28.1-28.3	290-9143-00
13955.000	10.8-11.0	290-9046-00	11377.500	19.6-19.8	290-9090-00	15677.500	28.2-28.4	290-9133-00
14155.000	11.0-11.2	290-9047-00	11477.500	19.8-20.0	290-9091-00	15727.500	28.3-28.5	290-9144-00
14355.000	11.2-11.4	290-9048-00	11577.500	20.0-20.2	290-9092-00	15777.500	28.4-28.6	290-9134-00
14555.000	11.4-11.6	290-9049-00	11677.500	20.2-20.4	290-9093-00	15827.500	28.5-28.7	290-9201-00
14755.000	11.6-11.8	290-9050-00	11777.500	20.4-20.6	290-9094-00	15877.500	28.6-28.8	290-9135-00
14955.000	11.8-12.0	290-9051-00	11877.500	20.6-20.8	290-9095-00	15927.500	28.7-28.9	290-9145-00
7577.500	12.0-12.2	290-9052-00	11977.500	20.8-21.0	290-9096-00	15977.500	28.8-29.0	290-9136-00
7677.500	12.2-12.4	290-9053-00	12077.500	21.0-21.2	290-9097-00	16027.500	28.9-29.1	290-9146-00
7777.500	12.4-12.6	290-9054-00	12177.500	21.2-21.4	290-9098-00	16077.500	29.0-29.2	290-9137-00
7877.500	12.6-12.8	290-9055-00	12277.500	21.4-21.6	290-9099-00	16127.500	29.1-29.3	290-9147-00
7977.500	12.8-13.0	290-9056-00	12377.500	21.6-21.8	290-9100-00	16177.500	29.2-29.4	290-9138-00
8077.500	13.0-13.2	290-9057-00	12477.500	21.8-22.0	290-9101-00	16227.500	29.3-29.5	290-9148-00
8177.500	13.2-13.4	290-9058-00	12577.500	22.0-22.2	290-9102-00	16277.500	29.4-29.6	290-9139-00
8277.500	13.4-13.6	290-9059-00	12677.500	22.2-22.4	290-9103-00	16327.500	29.5-29.7	290-9149-00
8377.500	13.6-13.8	290-9060-00	12777.500	22.4-22.6	290-9104-00	16377.500	29.6-29.8	290-9140-00
8477.500	13.8-14.0	290-9061-00	12877.500	22.6-22.8	290-9105-00	16477.500	29.8-30.0	290-9141-00

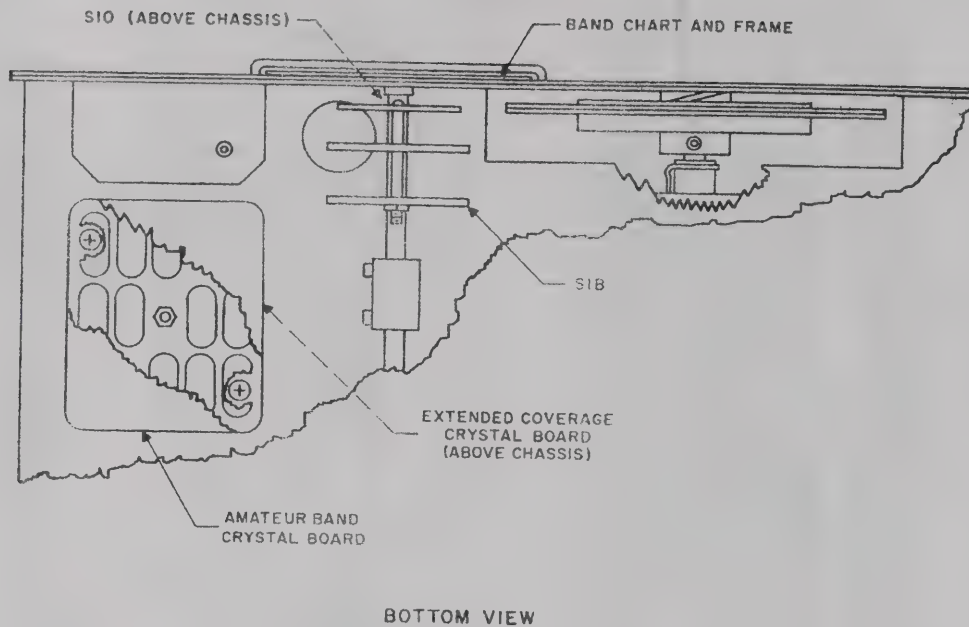


Figure 6-1. 75S-3A, Location of Added Components

C3, C4, C5, C6, C7, C9,  
C10, C12, C67, S4, T1

C15, C16, C17, C18, C19, C20  
C21, C22, C23, L2, R2, S3

C69, C70, C71, C72, C73, C74  
C75, C76, C120, S2, T2

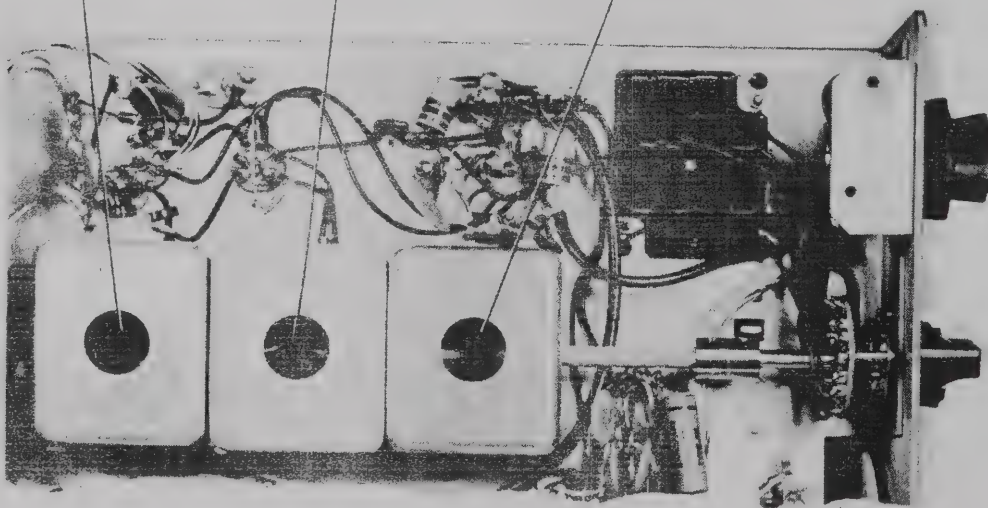


Figure 6-2. Bottom Right View, Parts Location



SECTION 6  
Parts List

ITEM	DESCRIPTION	COLLINS PART NUMBER
R13	RESISTOR, VARIABLE, COMPOSITION: 250 ohms $\pm 30\%$ , 0.2 w; Chicago Telephone type 70	376-4602-00
R14	RESISTOR, FIXED, COMPOSITION: same as R3	745-1352-00
R15	RESISTOR, FIXED, COMPOSITION: 15,000 ohms $\pm 10\%$ , 1 w; Allen-Bradley type GB	745-3401-00
R16	RESISTOR, FIXED, COMPOSITION: same as R2	745-1422-00
R17	RESISTOR, FIXED, COMPOSITION: 100 ohms $\pm 10\%$ , 1/2 w; Allen-Bradley type EB	745-1310-00
R18	RESISTOR, FIXED, COMPOSITION: same as R3	745-1352-00
R19	RESISTOR, FIXED, COMPOSITION: same as R11	745-1436-00
R20	NOT USED	
R21	RESISTOR, FIXED, COMPOSITION: same as R8	745-1303-00
R22	RESISTOR, FIXED, COMPOSITION: same as R3	745-1352-00
R23	RESISTOR, FIXED, COMPOSITION: same as R4	745-1450-00
R24	RESISTOR, FIXED, COMPOSITION: same as R1	745-1499-00
R25	RESISTOR, FIXED, COMPOSITION: 5600 ohms $\pm 10\%$ , 1/2 w; Allen-Bradley type EB	745-1384-00
R26	NOT USED	
R27	RESISTOR, FIXED, COMPOSITION: same as R17	745-1310-00
R28	RESISTOR, FIXED, COMPOSITION: same as R11	745-1436-00
R29	RESISTOR, FIXED, COMPOSITION: 6800 ohms $\pm 10\%$ , 1/2 w; Allen-Bradley type EB	745-1387-00
R30	RESISTOR, FIXED, COMPOSITION: same as R2	745-1422-00
R31	RESISTOR, VARIABLE, COMPOSITION: 10,000 ohms $\pm 30\%$ , 1/4 w; (includes R56); Allen-Bradley type CB	376-2151-00
R32	RESISTOR, FIXED, COMPOSITION: 12,000 ohms $\pm 10\%$ , 1/2 w; Allen-Bradley type EB	745-1398-00
R33	RESISTOR, FIXED, COMPOSITION: 330 ohms $\pm 10\%$ , 1/2 w; Allen-Bradley type EB	745-1331-00
R34	RESISTOR, FIXED, COMPOSITION: same as R11	745-1436-00
R35	RESISTOR, FIXED, COMPOSITION: same as R4	745-1450-00
R36	RESISTOR, FIXED, COMPOSITION: 1.0 megohm $\pm 10\%$ , 1/2 w; Allen-Bradley type EB	745-1478-00
R37	RESISTOR, FIXED, COMPOSITION: same as R4	745-1450-00
R38	RESISTOR, FIXED, COMPOSITION: same as R3	745-1352-00
R39	RESISTOR, FIXED, COMPOSITION: same as R11	745-1436-00
R40	RESISTOR, FIXED, COMPOSITION: same as R7	745-1429-00
R41	RESISTOR, FIXED, COMPOSITION: 100 ohms $\pm 10\%$ , 1/2 w; p/o P1; Allen-Bradley type EB	745-1310-00
R42	RESISTOR, FIXED, COMPOSITION: 680 ohms $\pm 10\%$ , 1/2 w; Allen-Bradley type EB	745-1345-00
R43	RESISTOR, FIXED, COMPOSITION: same as R11	745-1436-00
R44	RESISTOR, FIXED, COMPOSITION: same as R11	745-1436-00
R45	RESISTOR, FIXED, COMPOSITION: same as R3	745-1352-00
R46	RESISTOR, FIXED, COMPOSITION: same as R36	745-1478-00
R47	RESISTOR, FIXED, COMPOSITION: 1.5 megohms $\pm 10\%$ , 1/2 w; Allen-Bradley type EB	745-1485-00
R48	RESISTOR, FIXED, COMPOSITION: same as R4	745-1450-00
R49	RESISTOR, FIXED, COMPOSITION: same as R3	745-1352-00
R50	RESISTOR, FIXED, COMPOSITION: 4700 ohms $\pm 10\%$ , 1/2 w; Allen-Bradley type EB	745-1380-00
R51	RESISTOR, FIXED, COMPOSITION: 470 ohms $\pm 10\%$ , 2 w; Allen-Bradley type HB	745-5638-00
R52	RESISTOR, FIXED, COMPOSITION: 3900 ohms $\pm 10\%$ , 2 w; Allen-Bradley type HB	745-5677-00
R53	RESISTOR, FIXED, COMPOSITION: same as R2	745-1422-00
R54	RESISTOR, FIXED, COMPOSITION: 22,000 ohms $\pm 10\%$ , 1/2 w; Allen-Bradley type EB	745-1408-00
R55	RESISTOR, FIXED, COMPOSITION: same as R32	745-1398-00
R56	P/O R31	
R57	RESISTOR, VARIABLE, COMPOSITION: 1000 ohms $\pm 30\%$ , 0.2 w; Chicago Telephone type 70	376-4601-00
R58	RESISTOR, FIXED, COMPOSITION: same as R32	745-1398-00
R59	RESISTOR, FIXED, COMPOSITION: 1000 ohms $\pm 10\%$ , 2 w; Allen-Bradley type HB	745-5652-00
R60	RESISTOR, FIXED, COMPOSITION: same as R11	745-1436-00
R61	RESISTOR, FIXED, COMPOSITION: 470 ohms $\pm 10\%$ , 1/2 w; Allen-Bradley type EB	745-1338-00
R62	RESISTOR, FIXED, COMPOSITION: 10,000 ohms $\pm 10\%$ , 2 w; Allen-Bradley type HB	745-5694-00
R63	RESISTOR, FIXED, COMPOSITION: same as R36	745-1478-00
R64	RESISTOR, FIXED, COMPOSITION: same as R11	745-1436-00
R65	RESISTOR, FIXED, COMPOSITION: same as R36	745-1478-00
R66	RESISTOR, FIXED, COMPOSITION: same as R61	745-1338-00
R67	RESISTOR, FIXED, COMPOSITION: 1200 ohms $\pm 10\%$ , 1/2 w; Allen-Bradley type EB	745-1356-00
R68	RESISTOR, FIXED, COMPOSITION: same as R50	745-1380-00
R69	RESISTOR, FIXED, COMPOSITION: same as R2	745-1422-00
R70	RESISTOR, FIXED, COMPOSITION: same as R11	745-1436-00
R71	RESISTOR, FIXED, COMPOSITION: same as R42	745-1345-00
R72	RESISTOR, FIXED, COMPOSITION: 120 ohms $\pm 10\%$ , 1/2 w; Allen-Bradley type EB	745-1314-00
R73	RESISTOR, FIXED, COMPOSITION: same as R3	745-1352-00

ITEM	DESCRIPTION	COLLINS PART NUMBER
R74	RESISTOR, FIXED, COMPOSITION: 0.33 megohm $\pm 10\%$ , 1/2 w; Allen-Bradley type EB	745-1457-00
R75	RESISTOR, FIXED, COMPOSITION: 47 ohms $\pm 10\%$ , 1/2 w; Allen-Bradley type EB	745-1296-00
R76	P/O Q Multiplier	
R77	P/O Q Multiplier	
R78	RESISTOR, FIXED, COMPOSITION: same as R74	745-1457-00
R79	RESISTOR, FIXED, COMPOSITION: same as R2	745-1422-00
R80	P/O BFO (L10)	
R81	RESISTOR, VARIABLE: 100,000 ohms $\pm 30\%$ , 1/4 w (includes S13); Allen-Bradley type CB	376-2530-00
R82	RESISTOR, FIXED, COMPOSITION: 27,000 ohms $\pm 10\%$ , 1/2 w; Allen-Bradley type EB	745-1412-00
R83	RESISTOR, FIXED, COMPOSITION: 39,000 ohms $\pm 10\%$ , 1/2 w; Allen-Bradley type EB	745-1419-00
R84	RESISTOR, FIXED, COMPOSITION: 10,000 ohms $\pm 10\%$ , 1/2 w; Allen-Bradley type EB	745-1394-00
R85	RESISTOR, FIXED, COMPOSITION: same as R84	745-1394-00
R86	RESISTOR, FIXED, COMPOSITION: same as R3	745-1352-00
R87	RESISTOR, FIXED, COMPOSITION: same as R75	745-1296-00
S1A	SWITCH, ROTARY: 1 circuit, 14 position, 1 section; 1 moving, 16 fixed contacts; Oak Mfg. Co. part no. 91873-OK1	259-0981-00
S1B	SWITCH SECTION, ROTARY: 1 circuit (1 pole) 14 position, 1 moving, 16 fixed contacts (p/o 75S-3A only); Oak Mfg. Co. type CK	269-1977-00
S2	SWITCH SECTION, ROTARY: 1 circuit, 14 position, 1 moving, 10 fixed contacts; Oak Mfg. Co. type CK	269-2027-00
S3	SWITCH SECTION, ROTARY: same as S2	269-2027-00
S4	SWITCH SECTION, ROTARY: same as S2	269-2027-00
S5	SWITCH SECTION, ROTARY: 1 section, 4 position, 3 circuit, 12 fixed, 3 moving contacts; Oak Mfg. Co. type F	259-0949-00
S6	P/O S11	
S7	SWITCH SECTION, ROTARY: 2 circuit (2 pole) 12 position, 2 moving, 11 fixed contacts; Oak Mfg. Co.	269-2309-00
S8	SWITCH SECTION, ROTARY: 2 circuit (2 pole) 12 position, 2 moving, 10 fixed contacts; Oak Mfg. Co. part no. 218156-F	269-2310-00
S9	SWITCH SECTION, ROTARY: 2 circuit (2 pole) 12 position, 2 moving, 9 fixed contacts; Oak Mfg. Co. type F	269-2311-00
S10	P/O Q Multiplier	
S11	SWITCH, ROTARY: 3 circuit (3 pole) 4 position, 3 moving, 14 fixed contacts (includes S6); Oak Mfg. Co. part no. 217828-52	259-1483-00
S12	SWITCH, ROTARY: 1 circuit (1 pole) 3 position, 1 moving, 4 fixed contacts; Grigsby Co., Inc. type 4 MLR	259-1491-00
S13	P/O R81	
S14	SWITCH, ROTARY: 1 circuit (1 pole) 2 position, 1 moving contact, 3 fixed contacts (p/o 75S-3A only); Oak Mfg. Co. part no. 191774-23	259-0980-00
T1	TRANSFORMER, RADIO FREQUENCY: 3.4 to 30 mc; (includes C24, C26)	543-8120-002
T2	TRANSFORMER, RADIO FREQUENCY: 3.4 to 30 mc; (includes C44, C81)	543-8122-002
T3	TRANSFORMER AND COIL ASSEMBLY: 3.055 mc freq; 25/32 in. by 25/32 in. by 2.875 in. overall; Communications Coil part no. X-185-1A and X-185-1B	278-1721-00
T4	TRANSFORMER, INTERMEDIATE FREQUENCY: 440- to 470-kc frequency range; Communications Coil part no. X-083-1	278-0281-00
T5	TRANSFORMER, INTERMEDIATE FREQUENCY: same as T4	278-0281-00
T6	TRANSFORMER, INTERMEDIATE FREQUENCY: same as T4	278-0281-00
T7	TRANSFORMER, AUDIO FREQUENCY: pri 2500 ohms; sec. 500 ohms and 4 ohms (includes C35, C36); Stancor Electronics part no. 27232	667-0302-00
T8	TRANSFORMER, POWER: pri. 115 v, 50/60 cps, sec. no. 1, overall 220 v CT; sec. no. 2, 6.3 v (includes C103, C108); Stancor Electronics part no. 27868	662-0301-00
V1	ELECTRON TUBE: glass envelope; pentode; Radio Corp. of America part no. 6DC6	255-0226-00
V2	ELECTRON TUBE: same as V1	255-0226-00
V3	ELECTRON TUBE: miniature pentode; Radio Corp. of America part no. 6EA8	255-0379-00
V4	ELECTRON TUBE: same as V3	255-0379-00

**SECTION 6**  
**Parts List**

ITEM	DESCRIPTION	COLLINS PART NUMBER
V5	ELECTRON TUBE: twin triode; Radio Corp. of America part no. 12AX7	255-0201-00
V6	ELECTRON TUBE: glass envelope; pentode; Radio Corp. of America part no. 6BA6	255-0185-00
V7	ELECTRON TUBE: same as V6	255-0185-00
V8	ELECTRON TUBE: same as V3	255-0379-00
V9	ELECTRON TUBE: same as V1	255-0226-00
V10	ELECTRON TUBE: duplex-diode-triode; Radio Corp. of America part no. 6AT6	255-0190-00
V11	ELECTRON TUBE: pentode; General Electric Co. part no. 6BF5	255-0330-00
W1	CABLE ASSEMBLY: 3 conductor no. 18 AWG. A. C. plug and power connector (P6)	544-3121-00
XDS1	LAMPHOLDER: for use with miniature bayonet bulb; 1-3/8 in. lg o/a; Micarta Fabrications, Inc. part no. DB718	262-1210-00
XF1	FUSEHOLDER: extractor post type; 125 v, 5 amp; accommodates 3AG cartridge fuse; Bussman Mfg. Co. part no. HKP1-16	265-1002-00
XV1	SOCKET, ELECTRON TUBE: 7-pin miniature; molded construction; low loss composition; 0.343 in. h, 0.812 in. w, 1.125 in. lg o/a dim., excl terminals; Elco Mfg. Co., Inc. part no. 241BC	220-1044-00
XV2	SOCKET, ELECTRON TUBE: same as XV1	220-1044-00
XV3	SOCKET, ELECTRON TUBE: 9-pin miniature; molded construction; low loss composition; Elco Mfg. Co., Inc. part no. 274BC	220-1054-00
XV4	SOCKET, ELECTRON TUBE: same as XV3	220-1054-00
XV5	SOCKET, ELECTRON TUBE: same as XV3	220-1054-00
XV6	SOCKET, ELECTRON TUBE: same as XV1	220-1044-00
XV7	SOCKET, ELECTRON TUBE: same as XV1	220-1044-00
XV8	SOCKET, ELECTRON TUBE: same as XV3	220-1054-00
XV9	SOCKET, ELECTRON TUBE: same as XV1	220-1044-00
XV10	SOCKET, ELECTRON TUBE: same as XV1	220-1044-00
XV11	SOCKET, ELECTRON TUBE: same as XV1	220-1044-00
Y1	CRYSTAL UNIT, QUARTZ: 6.555-mc crystal frequency; 3.4- to 3.6-mc operating frequency; Midland Mfg. Co. part no. MO 8728	290-8728-00
Y2	CRYSTAL UNIT, QUARTZ: 6.755-mc crystal frequency; 3.6- to 3.8-mc operating frequency; Midland Mfg. Co. part no. MO 8729	290-8729-00
Y3	CRYSTAL UNIT, QUARTZ: 6.955-mc crystal frequency; 3.8- to 4.0-mc operating frequency; Midland Mfg. Co. part no. MO 8730	290-8730-00
Y4	CRYSTAL UNIT, QUARTZ: 10.155-mc crystal frequency; 7.0- to 7.2-mc operating frequency; Midland Mfg. Co. part no. MO 8731	290-8731-00
Y5	CRYSTAL UNIT, QUARTZ: 10.355-mc crystal frequency; 7.2- to 7.4-mc operating frequency; Midland Mfg. Co. part no. MO 8732	290-8732-00
Y6	CRYSTAL UNIT, QUARTZ: 8.5775-mc crystal frequency; 14.0- to 14.2-mc operating frequency; Midland Mfg. Co. part no. MO 8733	290-8733-00
Y7	CRYSTAL UNIT, QUARTZ: 8.6775-mc crystal frequency; 14.2- to 14.4-mc operating frequency; Midland Mfg. Co. part no. MO 8734	290-8734-00
Y8	CRYSTAL UNIT, QUARTZ: 8.9775-mc crystal frequency; 14.8- to 15.0-mc operating frequency; Midland Mfg. Co. part no. MO 8735	290-8735-00
Y9	CRYSTAL UNIT, QUARTZ: 12.0775-mc crystal frequency; 21.0- to 21.2-mc operating frequency; Midland Mfg. Co. part no. MO 8736	290-8736-00
Y10	CRYSTAL UNIT, QUARTZ: 12.1775-mc crystal frequency; 21.2- to 21.4-mc operating frequency; Midland Mfg. Co. part no. MO 8737	290-8737-00
Y11	CRYSTAL UNIT, QUARTZ: 12.2775-mc crystal frequency; 21.4- to 21.6-mc operating frequency; Midland Mfg. Co. part no. MO 8738	290-8738-00
Y12	CRYSTAL UNIT, QUARTZ: 15.8275-mc crystal frequency; 28.5- to 28.7-mc operating frequency; Midland Mfg. Co. part no. MO 8691	290-8691-00
Y13	NOT USED	

ITEM	DESCRIPTION	COLLINS PART NUMBER
Y14	NOT USED	
Y15	CRYSTAL UNIT, QUARTZ: 453.650-kc frequency; Midland Mfg. Co. part no. MO 8705	290-8705-00
Y16	CRYSTAL UNIT, QUARTZ: 456.350-kc frequency; Midland Mfg. Co. part no. MO 8706	290-8706-00
Y17	CRYSTAL UNIT, QUARTZ: 100.000-kc frequency; Billey Electric Co.	290-8454-00
70K-2 OSCILLATOR		522-1093-00
*C301	CAPACITOR, FIXED, CERAMIC: 20 uuf $\pm 20\%$ , 500 v d-c; Centralab part no. DA933-051	913-2879-00
*C301	CAPACITOR, FIXED, CERAMIC: 20 uuf $\pm 20\%$ , 500 v d-c; Centralab part no. DA933-050	913-2880-00
*C301	CAPACITOR, FIXED, CERAMIC: 20 uuf $\pm 20\%$ , 500 v d-c; Centralab part no. DA933-049	913-2881-00
*C301	CAPACITOR, FIXED, CERAMIC: 20 uuf $\pm 20\%$ , 500 v d-c; Centralab part no. DA933-048	913-2882-00
*C301	CAPACITOR, FIXED, CERAMIC: 20 uuf $\pm 20\%$ , 500 v d-c; Centralab part no. DA934-042	913-2883-00
*C301	CAPACITOR, FIXED, CERAMIC: 20 uuf $\pm 20\%$ , 500 v d-c; Centralab part no. DA934-038	913-2884-00
*C301	CAPACITOR, FIXED, CERAMIC: 100 uuf $\pm 20\%$ , 500 v d-c; Centralab part no. DA931-022	913-2897-00
*C301	CAPACITOR, FIXED, CERAMIC: 100 uuf $\pm 20\%$ , 500 v d-c; Centralab part no. DA932-008	913-2898-00
*C301	CAPACITOR, FIXED, CERAMIC: 100 uuf $\pm 20\%$ , 500 v d-c; Centralab part no. DA932-009	913-2899-00
C302	CAPACITOR, FIXED, MICA: 1000 uuf $\pm 1\%$ , 500 v d-c; Electro Motive part no. DM20F102F500WV	912-1749-00
C303	CAPACITOR, FIXED, MICA: 3000 uuf $\pm 10\%$ , 500 v d-c; Electro Motive part no. DM20F302F500WV	912-1748-00
C304	CAPACITOR, FIXED, MICA: 200 uuf $\pm 1\%$ , 300 v d-c; Electro Motive part no. DM15E201F300WV	912-3468-00
*C305	CAPACITOR, FIXED, CERAMIC: 100 uuf $\pm 2\%$ , 500 v d-c; Centralab part no. DA932-005	913-0074-00
*C305	CAPACITOR, FIXED, CERAMIC: 100 uuf $\pm 2\%$ , 500 v d-c; Centralab part no. DA933-017	913-0246-00
C306	CAPACITOR, FIXED, CERAMIC: 0.02 uf $\pm 60\%$ -40%, 250 v d-c; Sprague Electric Co. part no. 20C109	913-2097-00
C307	CAPACITOR, FIXED, CERAMIC: same as C306	917-1073-00
C308	CAPACITOR, VARIABLE, CERAMIC: 5.0 uuf min to 37.5 uuf max, 350 v d-c; Erie Resistor part no. 557018 COP0 39R	
C309	CAPACITOR, FIXED, CERAMIC: same as C306	913-2097-00
C310	CAPACITOR, FIXED, CERAMIC: same as C306	913-2097-00
CR301	DIODE: germanium; Sylvania part no. 1N34A	353-0103-00
L301	TRIMMER ASSEMBLY: Special	543-7323-00
L302	TRIMMER ASSEMBLY: same as L301	543-7323-00
L303	INDUCTOR, TUNING: Special	543-7333-00
L304	COIL, RADIO FREQUENCY: single layer wound, magnet wire, 3.30-uh inductance; Delevan Electronics	240-0695-00
R301	RESISTOR, COMPOSITION: 0.10 megohm $\pm 10\%$ , 1/2 w; Allen-Bradley type EB	745-1436-00
R302	RESISTOR, COMPOSITION: 82,000 ohms $\pm 10\%$ , 1/2 w; Allen-Bradley type EB	745-1433-00
R303	RESISTOR, COMPOSITION: same as R301	745-1436-00
T301	TRANSFORMER, RADIO FREQUENCY: pri. 380 uh nom. 790 kc; sec. 2.7 uh nom. 2.6 mc; Communication Coil	240-0665-00
V301	ELECTRON TUBE: type 6AU6; General Electric part no. 6AU6	255-0202-00

\*Select per operational requirement.



# 6

## section

### parts list

ITEM	DESCRIPTION	COLLINS PART NUMBER
	75S-3 RECEIVER 75S-3A RECEIVER	522-2562-00 522-2664-00
C1	CAPACITOR, FIXED, MICA: 510 uuf $\pm 5\%$ , 300 v d-c; Electro Motive part no. DM15F511J-300WV	912-2867-00
C2	CAPACITOR, FIXED, MICA: same as C1	912-2867-00
C3	CAPACITOR, VARIABLE, CERAMIC: 8 to 75 uuf, 350 v d-c; Erie Resistor Corp. part no. 557018 U2P0 34R	917-1075-00
C4	CAPACITOR, FIXED, MICA: 240 uuf $\pm 5\%$ , 500 v d-c; Electro Motive part no. DM15F241J-500WV	912-2843-00
C5	CAPACITOR, VARIABLE, CERAMIC: same as C3	917-1075-00
C6	CAPACITOR, FIXED, MICA: 100 uuf $\pm 5\%$ , 500 v d-c; Electro Motive part no. DM15F101J-500WV	912-2816-00
C7	CAPACITOR, VARIABLE, CERAMIC: same as C3	917-1075-00
C8	CAPACITOR, FIXED, CERAMIC: 0.1 uf -20% $\pm 80\%$ , 500 v d-c; Sprague Electric Co. part no. 41C92	913-3152-00
C9	CAPACITOR, VARIABLE, CERAMIC: 5 to 37.5 uuf, 350 v d-c; Erie Resistor Corp. part no. 557018 COP0 39R	917-1073-00
C10	CAPACITOR, VARIABLE, CERAMIC: same as C9	917-1073-00
C11	CAPACITOR, FIXED, CERAMIC: 1000 uuf $\pm 100\%$ -20%, 500 v d-c; Erie Resistor Corp. part no. 857018 X5U0 102Z	913-3009-00
C12	CAPACITOR, FIXED, CERAMIC: 1.0 uuf $\pm 1/4$ uuf, 500 v d-c; Centralab	916-0070-00
C13	CAPACITOR, FIXED, CERAMIC: 10,000 uuf $\pm 100\%$ -20%, 500 v d-c; Sprague of Wisc.	913-3013-00
C14	CAPACITOR, FIXED, CERAMIC: same as C11	913-3009-00
C15	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C16	CAPACITOR, VARIABLE, CERAMIC: same as C3	917-1075-00
C17	CAPACITOR, FIXED, MICA: 510 uuf $\pm 2\%$ , 300 v d-c; Electro Motive part no. DM15F511G300WV	912-2866-00
C18	CAPACITOR, VARIABLE, CERAMIC: same as C3	917-1075-00
C19	CAPACITOR, FIXED, MICA: 220 uuf $\pm 5\%$ , 500 v d-c; Electro Motive part no. DM15F221J500WV	912-2840-00
C20	CAPACITOR, VARIABLE, CERAMIC: same as C3	917-1075-00
C21	CAPACITOR, FIXED, MICA: 68 uuf $\pm 10\%$ , 500 v d-c; Electro Motive part no. DM15F680K500WV	912-2805-00
C22	CAPACITOR, VARIABLE, CERAMIC: same as C3	917-1075-00
C23	CAPACITOR, VARIABLE, CERAMIC: same as C9	917-1073-00
C24	P/O T1	
C25	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C26	P/O T1	
C27	CAPACITOR, FIXED, MICA: 15 uuf $\pm 10\%$ , 500 v d-c; Electro Motive part no. DM15C150K500WV	912-2760-00
C28	P/O L4	
C29	CAPACITOR, FIXED, ELECTROLYTIC: 8 uf -15% $\pm 100\%$ , 6 v d-c; Sprague Electric part no. D26717	183-1167-00
C30	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C31	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C32	CAPACITOR, FIXED, CERAMIC: same as C11	913-3009-00
C33	CAPACITOR, FIXED, MICA: 220 uuf $\pm 10\%$ , 500 v d-c; Electro Motive part no. DM15F221K500WV	912-2841-00
C34	CAPACITOR, FIXED, CERAMIC: same as C11	913-3009-00
C35	P/O T7	
C36	P/O T7	
C37	CAPACITOR, FIXED, CERAMIC: same as C11	913-3009-00
C38	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C39	P/O L6	
C40	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C41	CAPACITOR, FIXED, MICA: 100 uuf $\pm 10\%$ , 500 v d-c; Electro Motive part no. DM15F101K500WV	912-2817-00
C42	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C43	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00

ITEM	DESCRIPTION	COLLINS PART NUMBER
C44	P/O T2	
C45	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C46	CAPACITOR, FIXED, MICA: 10 uuf $\pm 10\%$ , 500 v d-c; Electro Motive part no. DM15C100K500WV	912-2754-00
C47	NOT USED	
C48	CAPACITOR, FIXED, CERAMIC: same as C11	913-3009-00
C49	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C50	CAPACITOR, FIXED, PAPER: 0.05 uf $\pm 30\%$ -10%, 200 v d-c; Sangamo type 33	931-0163-00
C51	CAPACITOR, FIXED, CERAMIC: same as C11	013-3009-00
C52	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C53	CAPACITOR, FIXED, MICA: 470 uuf $\pm 10\%$ , 300 v d-c; Electro Motive part no. DM15F471K300WV	912-2865-00
C54	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C55	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C56	CAPACITOR, FIXED, ELECTROLYTIC: 100 uf -10% $\pm 75\%$ , 6 v d-c; Sprague Electric part no. D28121	183-1782-00
C57	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C58	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C59	CAPACITOR, FIXED, ELECTROLYTIC: 3 sections, 40 uf each, -10% $\pm 40\%$ , 150 v d-c; Sprague Electric part no. D27999	183-1701-00
C60	CAPACITOR, FIXED, ELECTROLYTIC: 40 uf -10% $\pm 100\%$ , 150 v d-c; P. R. Mallory and Co., Inc. part no. TC48	183-1044-00
C61	CAPACITOR, VARIABLE, CERAMIC: same as C3	917-1075-00
C62	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C63	CAPACITOR, FIXED, MICA: same as C41	912-2817-00
C64	CAPACITOR, FIXED, MICA: same as C41	912-2817-00
C65	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C66	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C67	CAPACITOR, FIXED, MICA: 20 uuf $\pm 10\%$ , 500 v d-c; Electro Motive part no. DM15C200K500WV	912-2766-00
C68	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C69	CAPACITOR, VARIABLE, CERAMIC: same as C3	917-1075-00
C70	CAPACITOR, FIXED, MICA: 200 uuf $\pm 5\%$ , 500 v d-c; Electro Motive part no. DM15F201J500WV	912-2837-00
C71	CAPACITOR, VARIABLE, CERAMIC: same as C3	917-1075-00
C72	CAPACITOR, FIXED, MICA: 130 uuf $\pm 5\%$ , 500 v d-c; Electro Motive part no. DM15F131J500WV	912-2825-00
C73	CAPACITOR, VARIABLE, CERAMIC: same as C3	917-1075-00
C74	CAPACITOR, FIXED, MICA: same as C21	912-2805-00
C75	CAPACITOR, VARIABLE, CERAMIC: same as C3	917-1075-00
C76	CAPACITOR, VARIABLE, CERAMIC: same as C3	917-1075-00
C77	CAPACITOR, FIXED, CERAMIC: same as C11	913-3009-00
C78	CAPACITOR, FIXED, MICA: same as C27; used on 75S-3 only	912-2760-00
C79	CAPACITOR, FIXED, MICA: 47 uuf $\pm 10\%$ , 500 v d-c; Electro Motive part no. DM15E470K500WV	912-2793-00
C80	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C81	CAPACITOR, FIXED, MICA: same as C1; p/o T6	912-2867-00
C82	CAPACITOR, FIXED, MICA: same as C67	912-2766-00
C83	CAPACITOR, FIXED, MICA: 120 uuf $\pm 10\%$ , 500 v d-c; Electro Motive part no. DM15F121K500WV	912-2823-00
C84	CAPACITOR, FIXED, MICA: same as C53	912-2865-00
C85	NOT USED	
C86	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C87	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C88	NOT USED	
C89	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C90	CAPACITOR, FIXED, CERAMIC: same as C11	913-3009-00
C91	P/O L4	
C92	CAPACITOR, FIXED, CERAMIC: 3 uuf $\pm 1/4$ uuf, 500 v d-c; Centralab	916-0144-00
C93	CAPACITOR, FIXED, MICA: same as C27	912-2760-00
C94	CAPACITOR, FIXED, MICA: same as C41	912-2817-00
C95	CAPACITOR, FIXED, MICA: same as C4	912-2843-00
C96	NOT USED	



SECTION 6  
Parts List

ITEM	DESCRIPTION	COLLINS PART NUMBER
C97	CAPACITOR, FIXED, CERAMIC: same as C8	913-3152-00
C98	NOT USED	
C99	NOT USED	
C100	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C101	CAPACITOR, FIXED, CERAMIC: 10,000 uuf ±20%, 1000 v d-c; Centralab Div. of Globe Union, Inc. part no. DA134-048CB	913-3922-00
C102	CAPACITOR, FIXED, CERAMIC: 0.05 uf +80% -20%, 500 v d-c; Sprague Electric part no. 33C58 P O T8	913-3153-00
C103	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C104	CAPACITOR, FIXED, CERAMIC: same as C11	913-3009-00
C105	CAPACITOR, FIXED, MICA: same as C53	912-2865-00
C106	CAPACITOR, FIXED, ELECTROLYTIC: 10 uf -10% +100%, 150 v d-c; P. R. Mallory and Co., Inc. part no. TC42	183-1040-00
C107	P.O T8	
C108	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C109	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C110	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C111	CAPACITOR, FIXED, CERAMIC: same as C13	913-3922-00
C112	CAPACITOR, FIXED, CERAMIC: same as C101	913-3013-00
C113	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C114	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C115	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C116	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C117	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C118	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C119	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C120	CAPACITOR, FIXED, MICA: same as C27	912-2760-00
C121	CAPACITOR, FIXED, MICA: same as C41	912-2817-00
C122	CAPACITOR ASSEMBLY, VARIABLE, MICA: 7 uuf min, 60 uuf max, 350 v d-c; Electro Motive part no. T50410, capacitor; T16328, bracket (includes C126, C127)	918-0058-00
C123	CAPACITOR ASSEMBLY: same as C122	912-2811-00
C124	CAPACITOR, FIXED, MICA: 82 uuf ±10%, 500 v d-c; Electro Motive part no. DM15E820K500WV	912-2781-00
C125	CAPACITOR, FIXED, MICA: 33 uuf ±10%, 500 v d-c; Electro Motive part no. DM15E330K500WV	912-2799-00
C126	P O C122	
C127	P O C122	
C128	CAPACITOR, FIXED, MICA: 33 uuf ±10%, 500 v d-c; Electro Motive part no. DM15E560K500WV	913-3013-00
C129	CAPACITOR, FIXED, CERAMIC: same as C13	913-3009-00
C130	CAPACITOR, FIXED, CERAMIC: same as C11	912-2799-00
C131	CAPACITOR, FIXED, MICA: same as C128	913-3013-00
C132	P O Q Multiplier	
C133	P O Q Multiplier	
C134	P O Q Multiplier	
C135	CAPACITOR, FIXED, CERAMIC: same as C11	931-0163-00
C136	NOT USED	913-3013-00
C137	CAPACITOR, FIXED, PAPER: same as C50	913-3013-00
C138	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C139	NOT USED	
C140	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C141	CAPACITOR, FIXED, MICA: 180 uuf ±10%, 500 v d-c; Electro Motive part no. DM15F181K500WV	912-2835-00
C142	CAPACITOR, FIXED, MICA: same as C141	
C143	P O BFO (L10)	
C144	P O BFO (L10)	
C145	P O BFO (L10)	
C146	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C147	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C148	CAPACITOR, FIXED, MICA: same as C27	912-2760-00
CR1	SEMICONDUCTOR DEVICE, DIODE: silicon, axial lead mtd; metal and glass case, hermetically sealed; 400 v peak inverse voltage, General Electric part no. 1N1490	353-1659-00
CR2	SEMICONDUCTOR DEVICE, DIODE: same as CR1	353-1659-00
CR3	SEMICONDUCTOR DEVICE, DIODE: same as CR1	353-1659-00
CR4	P O BFO Assembly (L10)	
CR5	SEMICONDUCTOR DEVICE, DIODE: silicon, hermetically sealed; Hughes Aircraft part no. 47	353-2762-00
DS1	LAMP, INCANDESCENT: 6.3 v, 0.15 amp, 1-1/8 in. lg, clear; General Electric part no. 47	262-3240-00
F1	FUSE, CARTRIDGE: 2 amp, 250 v d-c; ferrule terminal; Littlefuse Inc. part no. 312002	264-4070-00
FL1	FILTER, BAND PASS: 455.0-kc operating fre- quency, 300-cycle bandwidth; Midland Mfg. Co. part no. M3-0843	293-0843-00
FL2	FILTER, BAND PASS: 455.0-kc operating fre- quency, 454.30- to 455.70-kc bandwidth	526-9337-00
J1	JACK, TIP: accommodates 1/8 in. plug; ceramic insulation, brass contacts; Cinch Mfg. Corp. part no. 201-11-01-018	360-0088-00

ITEM	DESCRIPTION	COLLINS PART NUMBER
J2	JACK, TIP: same as J1	360-0088-00
J3	NOT USED	
J4	NOT USED	
J5	JACK, TIP: same as J1	360-0088-00
J6	JACK, TELEPHONE: spring leaf contacts, J1-1B contact arrangement; Switchcraft, Inc. part no. 13E	360-0136-00
L1	NOT USED	
L2	NOT USED	
L3	TRANSFORMER AND COIL ASSEMBLY: 3.055-mc frequency, 25/32 in. by 25/32 in. by 2.875 in. overall; Communications Coil part no. X-185-1A and X-185-1B	278-1721-00
L4	COIL, RADIO FREQUENCY: 10,000 uh, 66.5 ohms d-c resistance, 75 ma current, no. 22 AWG tinned copper leads (includes C28, C91); Delevan part no. 2500-76	240-2564-00
L5	COIL, RADIO FREQUENCY: single layer wound, 10-uh inductance; Jeffers Electronics, Div. of Speer Carbon Co. part no. 10102-32	240-0149-00
L6	REACTOR: 1 coil, 3.0-hy inductance, 0.120-amp current, 100 ohms resistance (includes C39); Chicago Standard Transformer Corp. part no. 11272	668-0020-00
L7	COIL, RADIO FREQUENCY: 1000 uh, 16 ohms d-c resistance, 135 ma current, 700 v rms; Delevan Electronics part no. 2500-28	240-2540-00
L8	TRANSFORMER, INTERMEDIATE FREQUENCY: 455 kc; 1-1/4 in. by 1-19/64 in. by 4-3/8 in.; Communications Coil Co. part no. X-565-1	278-0653-00
L9	TRANSFORMER, INTERMEDIATE FREQUENCY: 455 kc; 25/32 in. by 25/32 in. by 3 in. over-all dimensions; Communications Coil Co. part no. X-004-2	278-0277-00
L10	TRANSFORMER, RADIO FREQUENCY: 200 turns litz wire, 1/4 pi wound, 25/32 in. by 25/32 in. by 3 in. overall (includes C143, C144, C145, CR4 and R80); Communications Coil Co. part no. X-453-1	278-0655-00
L11	NOT USED	
L12	COIL, RADIO FREQUENCY: 500 uh, 11 ohms d-c resistance, 170 ma current, 700 v rms; Delevan Electronics part no. 2500-14	240-2533-00
L13	NOT USED	
L14	COIL, RADIO FREQUENCY: 3 pi wound, 225 turns ea, 2.0 mh, no. 40 AWG; Delevan Electronics part no. BS-123	240-0084-00
L15	COIL, RADIO FREQUENCY: same as L14	240-0084-00
L16	COIL, RADIO FREQUENCY: 100 uh, 3.2 ohms d-c resistance, 530 ma current, 700 v rms; Jeffers Electronics Div. of Speer Carbon Co. part no. 10404-34	240-0193-00
M1	VOLTMETER: panel, d-c; meter range 0-1 ma, 0-250 v, 50 scale divisions; Simpson Electric type 127B	458-0044-00
P1	DUMMY LOAD, ELECTRICAL: 100 ohms im- pedance, 1/2 w; 1-1/2 in. dia by 1.139 in. lg overall; (includes R41)	544-3143-002
P2	NOT USED	
P3		
P4		
P5	CABLE ASSEMBLY, SPECIAL PURPOSE, ELEC- TRICAL: 3 conductors no. 18 AWG; 125 v rms working voltage; 0.325 in. dia by 6 ft 0.843 in. lg b o a; one end terminated w. plug connector; Belden Mfg. Co. KH3491	426-1464-00
P6	POWER CONNECTOR: 11 female contacts (see W1); Amphenol Borg part no. 78-S11M-1005	372-1952-00
R1	RESISTOR, FIXED, COMPOSITION: 3.3 megohms ±10%, 1/2 w; Allen-Bradley type EB	745-1499-00
R2	RESISTOR, FIXED, COMPOSITION: 47,000 ohms ±10%, 1/2 w; Allen-Bradley type EB	745-1422-00
R3	RESISTOR, FIXED, COMPOSITION: 1000 ohms ±10%, 1/2 w; Allen-Bradley type EB	745-1352-00
R4	RESISTOR, FIXED, COMPOSITION: 0.22 megohm ±10%, 1/2 w; Allen-Bradley type EB	745-1450-00
R5	RESISTOR, FIXED, COMPOSITION: same as R3	745-1352-00
R6	RESISTOR, FIXED, COMPOSITION: same as R3	745-1352-00
R7	RESISTOR, FIXED, COMPOSITION: 68,000 ohms ±10%, 1/2 w; Allen-Bradley type EB	745-1429-00
R8	RESISTOR, FIXED, COMPOSITION: 68,000 ohms ±10%, 1/2 w; Allen-Bradley type EB	745-1303-00
R9	RESISTOR, FIXED, COMPOSITION: same as R3	745-1352-00
R10	RESISTOR, FIXED, COMPOSITION: same as R3	745-1352-00
R11	RESISTOR, FIXED, COMPOSITION: 0.10 megohm ±10%, 1/2 w; Allen-Bradley type EB	745-1436-00
R12	RESISTOR, FIXED, COMPOSITION: same as R8	745-1303-00

## specifications

### 5.1 Frequency Coverage.

Both the 75S-3 and the 75S-3A Receivers are capable of receiving on any frequency within the range of 3.4 to 30.0 mc. Receiver coverage is in increments of 200 kc for each bandswitch setting. The 75S-3 is equipped with 14 crystal sockets, selectable from the front panel. The 75S-3A is equipped with 28 crystal

sockets, selectable from the front panel. With the 12 crystals furnished, both receivers provide complete coverage of 80 meters, 40 meters, 20 meters, 15 meters, WWV at 15 mc, and the 28.5- to 28.7-mc portion of the 10-meter band. Remaining crystal sockets may be used for additional 10-meter coverage. Other crystals may be substituted for those furnished to provide coverage at other frequencies throughout the range.

### 5.2 Equipment Characteristics.

Power requirements. . . . .	115 volts, 50 to 60 cps. Power consumption is approximately 90 watts. Power may be provided by an external supply which delivers 150 volts d-c at 125 ma and -70 volts d-c at 5 ma. Filament power may be a-c or d-c as follows: 6 to 7 volts at 5.5 amperes, 12 to 14 volts at 2.75 amperes, or 24 to 28 volts at 1.375 amperes.
Frequency range. . . . .	3.4 to 30.0 megacycles. With crystals furnished, bands are as follows: 3.4 to 3.6 mc, 3.6 to 3.8 mc, 3.8 to 4.0 mc, 7.0 to 7.2 mc, 7.2 to 7.4 mc, 14.0 to 14.2 mc, 14.2 to 14.4 mc, 14.8 to 15.0 mc, 21.0 to 21.2 mc, 21.2 to 21.4 mc, 21.4 to 21.6 mc, and 28.5 to 28.7 mc.
Mode . . . . .	Selectable single sideband, CW, or AM.
Sensitivity . . . . .	0.5 microvolt for 10-db signal-plus-noise to noise ratio in SSB mode.
Selectivity . . . . .	SSB: 2.1 kc at 6 db down, 4.2 kc at 60 db down. CW: 0.2 kc at 6 db down, 1.25 kc at 60 db down. AM: 4.5 kc at 6 db down, 25 kc at 60 db down.
Spurious response . . . . .	Image rejection better than 50 db. Internal spurious signals below one microvolt equivalent antenna input.
Frequency stability . . . . .	Within 100 cps after warmup.
Dial accuracy . . . . .	Better than one kc on any band after midband calibration.
S-meter calibration. . . . .	Approximately S-9 with 100-uv antenna input signal.
Audio output requirements. . . . .	Speaker: 3 to 4 ohms. Headphones: 500 ohms or higher.
Audio output level. . . . .	0.25 watt at age threshold. 1.8 watts maximum.
Size . . . . .	7-3/4 in. high, 14-3/4 in. wide, 12-1/2 in. deep.
Weight. . . . .	20 pounds.

### 5.3 Tube, Fuse, Lamp, And Semiconductor Complement.

TABLE 5-1. TUBES, FUSES, LAMPS, AND SEMICONDUCTORS

SYMBOL	FUNCTION	TYPE	SYMBOL	FUNCTION	TYPE
V1	Crystal calibrator	6DC6	V9	AM detector, agc rectifier, audio amplifier	6AT6
V2	R-f amplifier	6DC6	V10	Audio output	6BF5
V3A	First mixer	6EA8	V11	Tunable BFO	6DC6
V3B	Crystal oscillator	6EA8	V301	VFO	6AU6
V4A	Second mixer	6EA8	CR1, CR2	Power rectifiers	1N1490
V4B	Cathode follower	6EA8	CR3	Bias rectifier	1N1490
V5	Q-multiplier	12AX7	CR4	BFO tuning	HC7004
V6	First i-f amplifier	6BA6	CR5	Voltage regulator	1N732
V7	Second i-f amplifier	6BA6	CR301	Switch	1N34A
V8A	Product detector	6EA8	DS1, DS2	Dial lamps	47
V8B	Crystal BFO	6EA8	F1	Power supply fuse	2 amp

### 5.4 Available Accessories.

TABLE 5-2. AVAILABLE ACCESSORIES

ITEM	FUNCTION	COLLINS PART NUMBER
312B-3 Speaker	Station speaker	522-1166-00
312B-4 Station Control	Speaker, phone patch, directional wattmeter, and station control switches.	522-1167-00
351E-1 Mounting Plate	Table mount for 75S-3/3A.	522-1479-00
351E-2 Mounting Plate	Table mount for 312B-4.	522-1480-00
351E-3 Mounting Plate	Table mount for 312B-3.	522-1481-00
351R-1 Rack Mount	Rack mount for 75S-3/3A.	522-2665-00
351R-2 Rack Mount	Rack mount for 312B-4.	522-2666-00
Extra crystals	Additional band coverage.	See Parts List.
F455Y-31 Filter	3.1-kc band-pass filter.	526-9338-00
F455Y-40 Filter	4.0-kc band-pass filter.	526-9339-00
F455Y-60 Filter	6.0-kc band-pass filter.	526-9340-00
Filter Installation Kit	Parts for filter installation.	549-5095-00



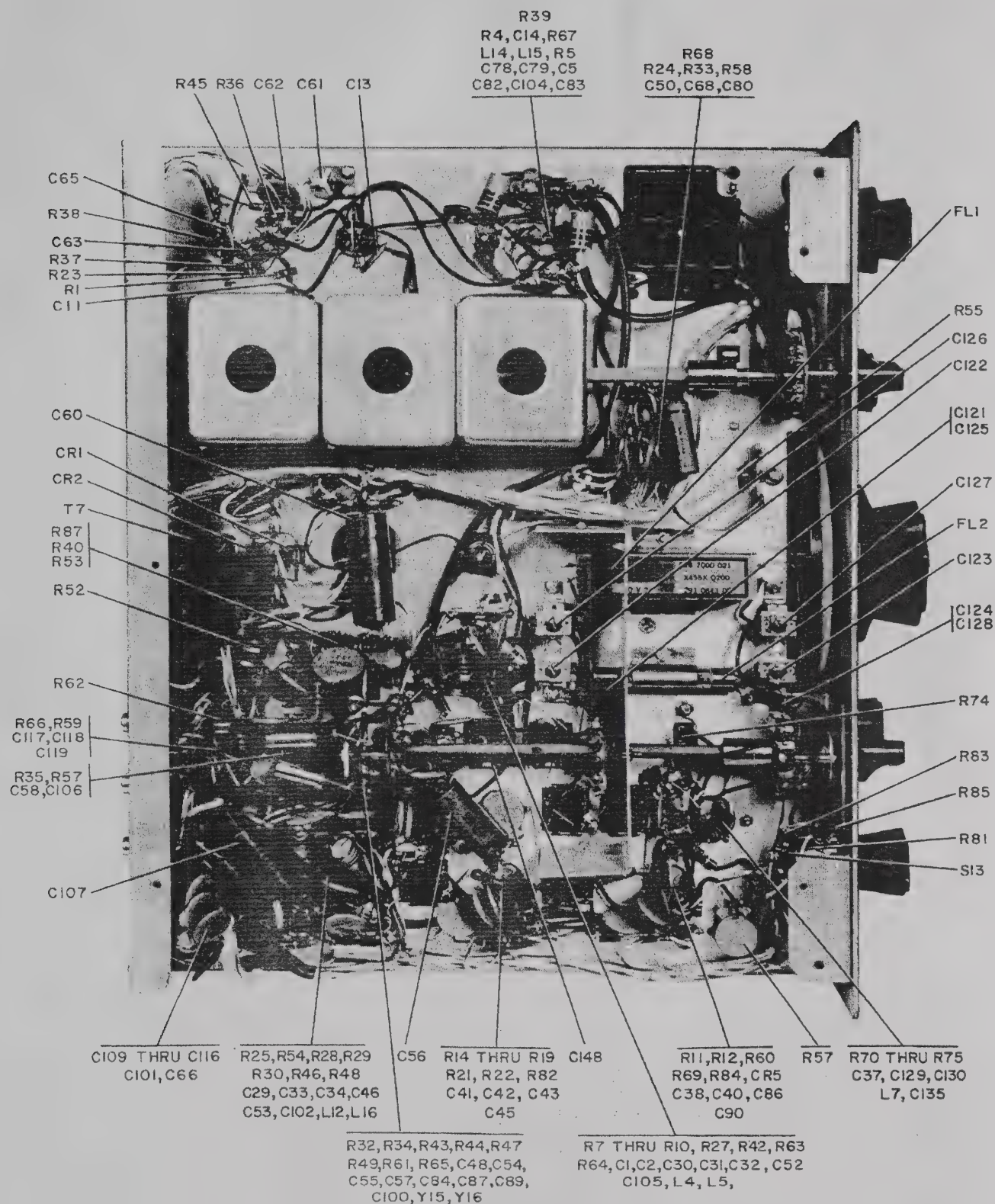


Figure 6-3. Bottom View, Parts Location



GENERAL COVERAGE CRYSTALS AVAILABLE									
CRYSTAL FREQUENCY (kc)	FOR OPERATING FREQUENCY (mc)	PART NUMBER	CRYSTAL FREQUENCY (kc)	FOR OPERATING FREQUENCY (mc)	PART NUMBER	CRYSTAL FREQUENCY (kc)	FOR OPERATING FREQUENCY (mc)	PART NUMBER	
6555.000	3.4-3.6	290-9009-00	8577.500	14.0-14.2	290-9062-00	12977.500	22.8-23.0	290-9106-00	
6755.000	3.6-3.8	290-9010-00	8652.500	14.15-14.35	290-9180-00	13077.500	23.0-23.2	290-9107-00	
6955.000	3.8-4.0	290-9011-00	8677.500	14.2-14.4	290-9063-00	13177.500	23.2-23.4	290-9108-00	
7155.000	4.0-4.2	290-9012-00	8777.500	14.4-14.6	290-9064-00	13277.500	23.4-23.6	290-9109-00	
7355.000	4.2-4.4	290-9013-00	8877.500	14.6-14.8	290-9065-00	13377.500	23.6-23.8	290-9110-00	
7555.000	4.4-4.6	290-9014-00	8977.500	14.8-15.0	290-9066-00	13477.500	23.8-24.0	290-9111-00	
7755.000	4.6-4.8	290-9015-00	9077.500	15.0-15.2	290-9067-00	13577.500	24.0-24.2	290-9112-00	
7955.000	4.8-5.0	290-9016-00	9177.500	15.2-15.4	290-9068-00	13677.500	24.2-24.4	290-9113-00	
9755.000	6.6-6.8	290-9025-00	9277.500	15.4-15.6	290-9069-00	13777.500	24.4-24.6	290-9114-00	
9955.000	6.8-7.0	290-9026-00	9377.500	15.6-15.8	290-9070-00	13877.500	24.6-24.8	290-9115-00	
10155.000	7.0-7.2	290-9027-00	9477.500	15.8-16.0	290-9071-00	13977.500	24.8-25.0	290-9116-00	
10355.000	7.2-7.4	290-9028-00	9577.500	16.0-16.2	290-9072-00	14077.500	25.0-25.2	290-9117-00	
10555.000	7.5-7.6	290-9029-00	9677.500	16.2-16.4	290-9073-00	14177.500	25.2-25.4	290-9118-00	
10755.000	7.4-7.6	290-9030-00	9777.500	16.4-16.6	290-9074-00	14277.500	25.4-25.6	290-9119-00	
10955.000	7.8-8.0	290-9031-00	9877.500	16.6-16.8	290-9075-00	14377.500	25.6-25.8	290-9120-00	
11155.000	8.0-8.2	290-9032-00	9977.500	16.8-17.0	290-9076-00	14477.500	25.8-26.0	290-9121-00	
11355.000	8.2-8.4	290-9033-00	10077.500	17.0-17.2	290-9077-00	14577.500	26.0-26.2	290-9122-00	
11555.000	8.4-8.6	290-9034-00	10177.500	17.2-17.4	290-9078-00	14677.500	26.2-26.4	290-9123-00	
11755.000	8.6-8.8	290-9035-00	10277.500	17.4-17.6	290-9079-00	14777.500	26.4-26.6	290-9124-00	
11955.000	8.8-9.0	290-9036-00	10377.500	17.6-17.8	290-9080-00	14877.500	26.6-26.8	290-9125-00	
12155.000	9.0-9.2	290-9037-00	10477.500	17.8-18.0	290-9081-00	14977.500	26.8-27.0	290-9126-00	
12355.000	9.2-9.4	290-9038-00	10577.500	18.0-18.2	290-9082-00	15077.500	27.0-27.2	290-9127-00	
12555.000	9.4-9.6	290-9039-00	10677.500	18.2-18.4	290-9083-00	15177.500	27.2-27.4	290-9128-00	
12755.000	9.6-9.8	290-9040-00	10777.500	18.4-18.6	290-9084-00	15277.500	27.4-27.6	290-9129-00	
12955.000	9.8-10.0	290-9041-00	10877.500	18.6-18.8	290-9085-00	15377.500	27.6-27.8	290-9130-00	
13155.000	10.0-10.2	290-9042-00	10977.500	18.8-19.0	290-9086-00	15477.500	27.8-28.0	290-9131-00	
13355.000	10.2-10.4	290-9043-00	11077.500	19.0-19.2	290-9087-00	15527.500	27.9-28.1	290-9142-00	
13555.000	10.4-10.6	290-9044-00	11177.500	19.2-19.4	290-9088-00	15577.500	28.0-28.2	290-9132-00	
13755.000	10.6-10.8	290-9045-00	11277.500	19.4-19.6	290-9089-00	15627.500	28.1-28.3	290-9143-00	
13955.000	10.8-11.0	290-9046-00	11377.500	19.6-19.8	290-9090-00	15677.500	28.2-28.4	290-9133-00	
14155.000	11.0-11.2	290-9047-00	11477.500	19.8-20.0	290-9091-00	15727.500	28.3-28.5	290-9144-00	
14355.000	11.2-11.4	290-9048-00	11577.500	20.0-20.2	290-9092-00	15777.500	28.4-28.6	290-9134-00	
14555.000	11.4-11.6	290-9049-00	11677.500	20.2-20.4	290-9093-00	15827.500	28.5-28.7	290-9201-00	
14755.000	11.6-11.8	290-9050-00	11777.500	20.4-20.6	290-9094-00	15877.500	28.6-28.8	290-9135-00	
14955.000	11.8-12.0	290-9051-00	11877.500	20.6-20.8	290-9095-00	15927.500	28.7-28.9	290-9145-00	
7577.500	12.0-12.2	290-9052-00	11977.500	20.8-21.0	290-9096-00	15977.500	28.8-29.0	290-9136-00	
7677.500	12.2-12.4	290-9053-00	12077.500	21.0-21.2	290-9097-00	16027.500	28.9-29.1	290-9146-00	
7777.500	12.4-12.6	290-9054-00	12177.500	21.2-21.4	290-9098-00	16077.500	29.0-29.2	290-9137-00	
7877.500	12.6-12.8	290-9055-00	12277.500	21.4-21.6	290-9099-00	16127.500	29.1-29.3	290-9147-00	
7977.500	12.8-13.0	290-9056-00	12377.500	21.6-21.8	290-9100-00	16177.500	29.2-29.4	290-9138-00	
8077.500	13.0-13.2	290-9057-00	12477.500	21.8-22.0	290-9101-00	16227.500	29.3-29.5	290-9148-00	
8177.500	13.2-13.4	290-9058-00	12577.500	22.0-22.2	290-9102-00	16277.500	29.4-29.6	290-9139-00	
8277.500	13.4-13.6	290-9059-00	12677.500	22.2-22.4	290-9103-00	16327.500	29.5-29.7	290-9149-00	
8377.500	13.6-13.8	290-9060-00	12777.500	22.4-22.6	290-9104-00	16377.500	29.6-29.8	290-9140-00	
8477.500	13.8-14.0	290-9061-00	12877.500	22.6-22.8	290-9105-00	16477.500	29.8-30.0	290-9141-00	



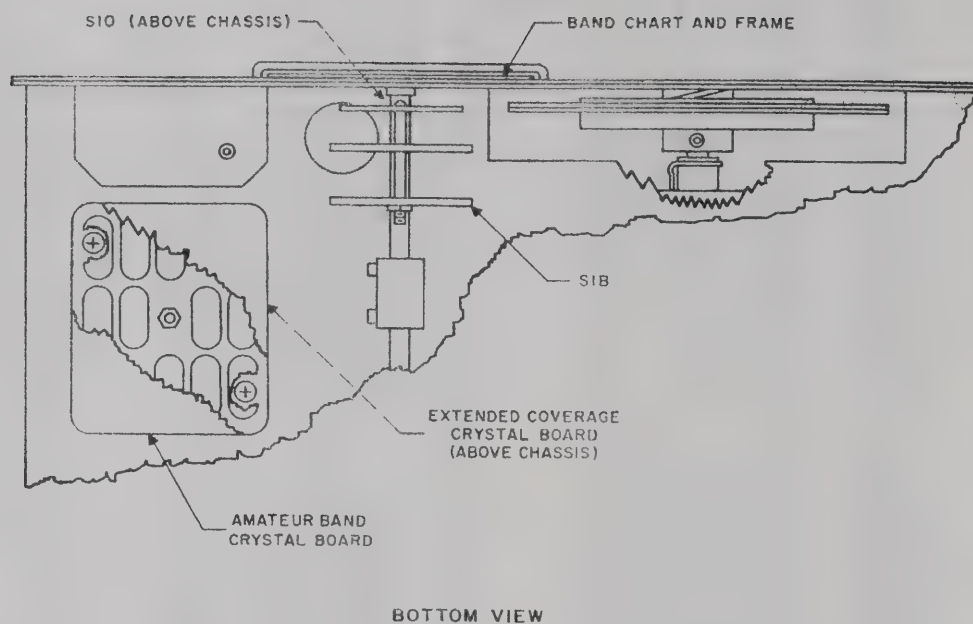


Figure 6-1. 75S-3A, Location of Added Components

C3, C4, C5, C6, C7, C9, C10, C12, C67, S4, T1	C15, C16, C17, C18, C19, C20 C21, C22, C23, L2, R2, S3	C69, C70, C71, C72, C73, C74 C75, C76, C120, S2, T2
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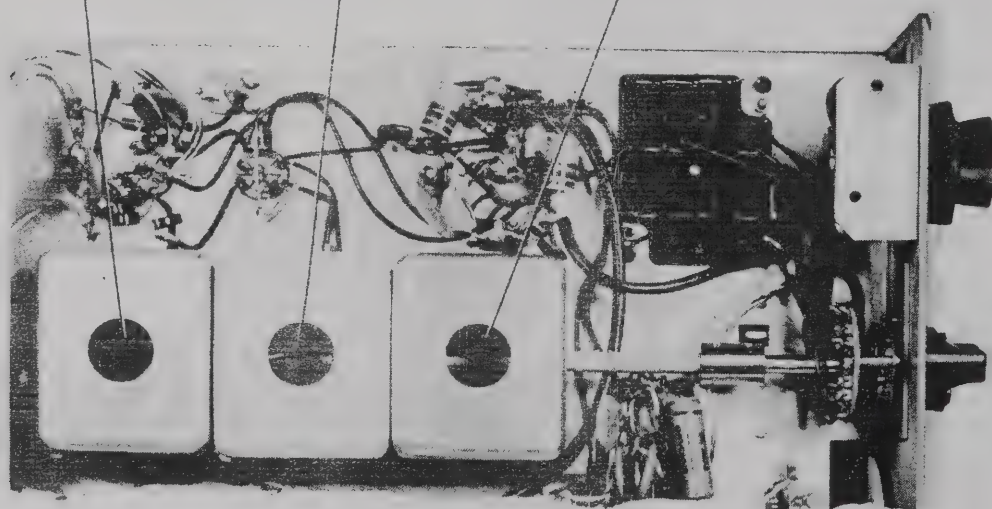


Figure 6-2. Bottom Right View, Parts Location

SECTION 6  
Parts List

ITEM	DESCRIPTION	COLLINS PART NUMBER
R13	RESISTOR, VARIABLE, COMPOSITION: 250 ohms ±30%, 0.2 w; Chicago Telephone type 70	376-4602-00
R14	RESISTOR, FIXED, COMPOSITION: same as R3	745-1352-00
R15	RESISTOR, FIXED, COMPOSITION: 15,000 ohms ±10%, 1 w; Allen-Bradley type GB	745-3401-00
R16	RESISTOR, FIXED, COMPOSITION: same as R2	745-1422-00
R17	RESISTOR, FIXED, COMPOSITION: 100 ohms ±10%, 1/2 w; Allen-Bradley type EB	745-1310-00
R18	RESISTOR, FIXED, COMPOSITION: same as R3	745-1352-00
R19	RESISTOR, FIXED, COMPOSITION: same as R11	745-1436-00
R20	NOT USED	
R21	RESISTOR, FIXED, COMPOSITION: same as R8	745-1303-00
R22	RESISTOR, FIXED, COMPOSITION: same as R3	745-1352-00
R23	RESISTOR, FIXED, COMPOSITION: same as R4	745-1450-00
R24	RESISTOR, FIXED, COMPOSITION: same as R1	745-1499-00
R25	RESISTOR, FIXED, COMPOSITION: 5600 ohms ±10%, 1/2 w; Allen-Bradley type EB	745-1384-00
R26	NOT USED	
R27	RESISTOR, FIXED, COMPOSITION: same as R17	745-1310-00
R28	RESISTOR, FIXED, COMPOSITION: same as R11	745-1436-00
R29	RESISTOR, FIXED, COMPOSITION: 6800 ohms ±10%, 1/2 w; Allen-Bradley type EB	745-1387-00
R30	RESISTOR, FIXED, COMPOSITION: same as R2	745-1422-00
R31	RESISTOR, VARIABLE, COMPOSITION: 10,000 ohms ±30%, 1-4 w; (includes R56); Allen-Bradley type CB	376-2151-00
R32	RESISTOR, FIXED, COMPOSITION: 12,000 ohms ±10%, 1/2 w; Allen-Bradley type EB	745-1398-00
R33	RESISTOR, FIXED, COMPOSITION: 330 ohms ±10%, 1/2 w; Allen-Bradley type EB	745-1331-00
R34	RESISTOR, FIXED, COMPOSITION: same as R11	745-1436-00
R35	RESISTOR, FIXED, COMPOSITION: same as R4	745-1450-00
R36	RESISTOR, FIXED, COMPOSITION: 1.0 megohm ±10%, 1/2 w; Allen-Bradley type EB	745-1478-00
R37	RESISTOR, FIXED, COMPOSITION: same as R4	745-1450-00
R38	RESISTOR, FIXED, COMPOSITION: same as R3	745-1352-00
R39	RESISTOR, FIXED, COMPOSITION: same as R11	745-1436-00
R40	RESISTOR, FIXED, COMPOSITION: same as R7	745-1429-00
R41	RESISTOR, FIXED, COMPOSITION: 100 ohms ±10%, 1/2 w; p/o PI: Allen-Bradley type EB	745-1310-00
R42	RESISTOR, FIXED, COMPOSITION: 680 ohms ±10%, 1/2 w; Allen-Bradley type EB	745-1345-00
R43	RESISTOR, FIXED, COMPOSITION: same as R11	745-1436-00
R44	RESISTOR, FIXED, COMPOSITION: same as R11	745-1436-00
R45	RESISTOR, FIXED, COMPOSITION: same as R3	745-1352-00
R46	RESISTOR, FIXED, COMPOSITION: same as R36	745-1478-00
R47	RESISTOR, FIXED, COMPOSITION: 1.5 megohms ±10%, 1/2 w; Allen-Bradley type EB	745-1485-00
R48	RESISTOR, FIXED, COMPOSITION: same as R4	745-1450-00
R49	RESISTOR, FIXED, COMPOSITION: same as R3	745-1352-00
R50	RESISTOR, FIXED, COMPOSITION: 4700 ohms ±10%, 1/2 w; Allen-Bradley type EB	745-1380-00
R51	RESISTOR, FIXED, COMPOSITION: 470 ohms ±10%, 2 w; Allen-Bradley type HB	745-5638-00
R52	RESISTOR, FIXED, COMPOSITION: 3900 ohms ±10%, 2 w; Allen-Bradley type HB	745-5677-00
R53	RESISTOR, FIXED, COMPOSITION: same as R2	745-1422-00
R54	RESISTOR, FIXED, COMPOSITION: 22,000 ohms ±10%, 1/2 w; Allen-Bradley type EB	745-1408-00
R55	RESISTOR, FIXED, COMPOSITION: same as R32	745-1398-00
R56	P/O R31	
R57	RESISTOR, VARIABLE, COMPOSITION: 1000 ohms ±30%, 0.2 w; Chicago Telephone type 70	376-4601-00
R58	RESISTOR, FIXED, COMPOSITION: same as R32	745-1398-00
R59	RESISTOR, FIXED, COMPOSITION: 1000 ohms ±10%, 2 w; Allen-Bradley type HB	745-5652-00
R60	RESISTOR, FIXED, COMPOSITION: same as R11	745-1436-00
R61	RESISTOR, FIXED, COMPOSITION: 470 ohms ±10%, 1/2 w; Allen-Bradley type EB	745-1338-00
R62	RESISTOR, FIXED, COMPOSITION: 10,000 ohms ±10%, 2 w; Allen-Bradley type HB	745-5694-00
R63	RESISTOR, FIXED, COMPOSITION: same as R36	745-1478-00
R64	RESISTOR, FIXED, COMPOSITION: same as R11	745-1436-00
R65	RESISTOR, FIXED, COMPOSITION: same as R36	745-1478-00
R66	RESISTOR, FIXED, COMPOSITION: same as R61	745-1338-00
R67	RESISTOR, FIXED, COMPOSITION: 1200 ohms ±10%, 1/2 w; Allen-Bradley type EB	745-1356-00
R68	RESISTOR, FIXED, COMPOSITION: same as R50	745-1380-00
R69	RESISTOR, FIXED, COMPOSITION: same as R2	745-1422-00
R70	RESISTOR, FIXED, COMPOSITION: same as R11	745-1436-00
R71	RESISTOR, FIXED, COMPOSITION: same as R42	745-1345-00
R72	RESISTOR, FIXED, COMPOSITION: 120 ohms ±10%, 1/2 w; Allen-Bradley type EB	745-1314-00
R73	RESISTOR, FIXED, COMPOSITION: same as R3	745-1352-00

ITEM	DESCRIPTION	COLLINS PART NUMBER
R74	RESISTOR, FIXED, COMPOSITION: 0.33 megohm ±10%, 1/2 w; Allen-Bradley type EB	745-1457-00
R75	RESISTOR, FIXED, COMPOSITION: 47 ohms ±10%, 1/2 w; Allen-Bradley type EB	745-1296-00
R76	P/O Q Multiplier	
R77	P/O Q Multiplier	
R78	RESISTOR, FIXED, COMPOSITION: same as R74	745-1457-00
R79	RESISTOR, FIXED, COMPOSITION: same as R2	745-1422-00
R80	P/O BFO (L10)	
R81	RESISTOR, VARIABLE: 100,000 ohms ±30%, 1/4 w (includes S13); Allen-Bradley type CB	376-2530-00
R82	RESISTOR, FIXED, COMPOSITION: 27,000 ohms ±10%, 1/2 w; Allen-Bradley type EB	745-1412-00
R83	RESISTOR, FIXED, COMPOSITION: 39,000 ohms ±10%, 1/2 w; Allen-Bradley type EB	745-1419-00
R84	RESISTOR, FIXED, COMPOSITION: 10,000 ohms ±10%, 1/2 w; Allen-Bradley type EB	745-1394-00
R85	RESISTOR, FIXED, COMPOSITION: same as R84	745-1394-00
R86	RESISTOR, FIXED, COMPOSITION: same as R3	745-1352-00
R87	RESISTOR, FIXED, COMPOSITION: same as R75	745-1296-00
S1A	SWITCH, ROTARY: 1 circuit, 14 position, 1 section; 1 moving, 16 fixed contacts; Oak Mfg. Co. part no. 91873-OK1	259-0981-00
S1B	SWITCH SECTION, ROTARY: 1 circuit (1 pole) 14 position, 1 moving, 16 fixed contacts (p/o 75S-3A only); Oak Mfg. Co. type CK	269-1977-00
S2	SWITCH SECTION, ROTARY: 1 circuit, 14 posi- tion, 1 moving, 10 fixed contacts; Oak Mfg. Co. type CK	269-2027-00
S3	SWITCH SECTION, ROTARY: same as S2	269-2027-00
S4	SWITCH SECTION, ROTARY: same as S2	269-2027-00
S5	SWITCH SECTION, ROTARY: 1 section, 4 position, 3 circuit, 12 fixed, 3 moving contacts; Oak Mfg. Co. type F	259-0949-00
S6	P/O S11	
S7	SWITCH SECTION, ROTARY: 2 circuit (2 pole) 12 position, 2 moving, 11 fixed contacts; Oak Mfg. Co.	269-2309-00
S8	SWITCH SECTION, ROTARY: 2 circuit (2 pole) 12 position, 2 moving, 10 fixed contacts; Oak Mfg. Co. part no. 218156-F	269-2310-00
S9	SWITCH SECTION, ROTARY: 2 circuit (2 pole) 12 position, 2 moving, 9 fixed contacts; Oak Mfg. Co. type F	269-2311-00
S10	P/O Q Multiplier	
S11	SWITCH, ROTARY: 3 circuit (3 pole) 4 position, 3 moving, 14 fixed contacts (includes S6); Oak Mfg. Co. part no. 217828-52	259-1483-00
S12	SWITCH, ROTARY: 1 circuit (1 pole) 3 position, 1 moving, 4 fixed contacts; Grigsby Co., Inc. type 4 MLR	259-1491-00
S13	P/O R81	
S14	SWITCH, ROTARY: 1 circuit (1 pole) 2 position, 1 moving contact, 3 fixed contacts (p/o 75S-3A only); Oak Mfg. Co. part no. 191774-23	259-0980-00
T1	TRANSFORMER, RADIO FREQUENCY: 3.4 to 30 mc; (includes C24, C26)	543-8120-002
T2	TRANSFORMER, RADIO FREQUENCY: 3.4 to 30 mc; (includes C44, C81)	543-8122-002
T3	TRANSFORMER AND COIL ASSEMBLY: 3.055 mc freq; 25/32 in. by 25/32 in. by 2.875 in. overall; Communications Coil part no. X-185-1A and X-185-1B	278-1721-00
T4	TRANSFORMER, INTERMEDIATE FREQUENCY: 440- to 470-kc frequency range; Communications Coil part no. X-083-1	278-0281-00
T5	TRANSFORMER, INTERMEDIATE FREQUENCY: same as T4	278-0281-00
T6	TRANSFORMER, INTERMEDIATE FREQUENCY: same as T4	278-0281-00
T7	TRANSFORMER, AUDIO FREQUENCY: pri 2500 ohms; sec. 500 ohms and 4 ohms (includes C35, C36); Stancor Electronics part no. 27232	667-0302-00
T8	TRANSFORMER, POWER: pri. 115 v, 50/60 cps, sec. no. 1, overall 220 v CT; sec. no. 2, 6.3 v (includes C103, C108); Stancor Electronics part no. 27868	662-0301-00
V1	ELECTRON TUBE: glass envelope; pentode; Radio Corp. of America part no. 6DC6	255-0226-00
V2	ELECTRON TUBE: same as V1	255-0226-00
V3	ELECTRON TUBE: miniature pentode; Radio Corp. of America part no. 6EA8	255-0379-00
V4	ELECTRON TUBE: same as V3	255-0379-00



# SECTION 6

## Parts List

ITEM	DESCRIPTION	COLLINS PART NUMBER
V5	ELECTRON TUBE: twin triode; Radio Corp. of America part no. 12AX7	255-0201-00
V6	ELECTRON TUBE: glass envelope; pentode; Radio Corp. of America part no. 6BA6	255-0185-00
V7	ELECTRON TUBE: same as V6	255-0185-00
V8	ELECTRON TUBE: same as V3	255-0379-00
V9	ELECTRON TUBE: same as V1	255-0226-00
V10	ELECTRON TUBE: duplex-diode-triode; Radio Corp. of America part no. 6AT6	255-0190-00
V11	ELECTRON TUBE: pentode; General Electric Co. part no. 6BF5	255-0330-00
W1	CABLE ASSEMBLY: 3 conductor no. 18 AWG. A. C. plug and power connector (P6)	544-3121-00
XDS1	LAMPHOLDER: for use with miniature bayonet bulb; 1-3/8 in. lg o/a; Micarta Fabrications, Inc. part no. DB718	262-1210-00
XF1	FUSEHOLDER: extractor post type; 125 v, 5 amp; accommodates 3AG cartridge fuse; Bussman Mfg. Co. part no. HKP1-16	265-1002-00
XV1	SOCKET, ELECTRON TUBE: 7-pin miniature; molded construction; low loss composition; 0.343 in. h, 0.812 in. w, 1.125 in. lg o/a dim., excl terminals; Elco Mfg. Co., Inc. part no. 241BC	220-1044-00
XV2	SOCKET, ELECTRON TUBE: same as XV1	220-1044-00
XV3	SOCKET, ELECTRON TUBE: 9-pin miniature; molded construction; low loss composition; Elco Mfg. Co., Inc. part no. 274BC	220-1054-00
XV4	SOCKET, ELECTRON TUBE: same as XV3	220-1054-00
XV5	SOCKET, ELECTRON TUBE: same as XV3	220-1054-00
XV6	SOCKET, ELECTRON TUBE: same as XV1	220-1044-00
XV7	SOCKET, ELECTRON TUBE: same as XV1	220-1044-00
XV8	SOCKET, ELECTRON TUBE: same as XV3	220-1054-00
XV9	SOCKET, ELECTRON TUBE: same as XV1	220-1044-00
XV10	SOCKET, ELECTRON TUBE: same as XV1	220-1044-00
XV11	SOCKET, ELECTRON TUBE: same as XV1	220-1044-00
Y1	CRYSTAL UNIT, QUARTZ: 6.555-mc crystal frequency; 3.4- to 3.6-mc operating frequency; Midland Mfg. Co. part no. MO 8728	290-8728-00
Y2	CRYSTAL UNIT, QUARTZ: 6.755-mc crystal frequency; 3.6- to 3.8-mc operating frequency; Midland Mfg. Co. part no. MO 8729	290-8729-00
Y3	CRYSTAL UNIT, QUARTZ: 6.955-mc crystal frequency; 3.8- to 4.0-mc operating frequency; Midland Mfg. Co. part no. MO 8730	290-8730-00
Y4	CRYSTAL UNIT, QUARTZ: 10.155-mc crystal frequency; 7.0- to 7.2-mc operating frequency; Midland Mfg. Co. part no. MO 8731	290-8731-00
Y5	CRYSTAL UNIT, QUARTZ: 10.355-mc crystal frequency; 7.2- to 7.4-mc operating frequency; Midland Mfg. Co. part no. MO 8732	290-8732-00
Y6	CRYSTAL UNIT, QUARTZ: 8.5775-mc crystal frequency; 14.0- to 14.2-mc operating frequency; Midland Mfg. Co. part no. MO 8733	290-8733-00
Y7	CRYSTAL UNIT, QUARTZ: 8.6775-mc crystal frequency; 14.2- to 14.4-mc operating frequency; Midland Mfg. Co. part no. MO 8734	290-8734-00
Y8	CRYSTAL UNIT, QUARTZ: 8.9775-mc crystal frequency; 14.8- to 15.0-mc operating frequency; Midland Mfg. Co. part no. MO 8735	290-8735-00
Y9	CRYSTAL UNIT, QUARTZ: 12.0775-mc crystal frequency; 21.0- to 21.2-mc operating frequency; Midland Mfg. Co. part no. MO 8736	290-8736-00
Y10	CRYSTAL UNIT, QUARTZ: 12.1775-mc crystal frequency; 21.2- to 21.4-mc operating frequency; Midland Mfg. Co. part no. MO 8737	290-8737-00
Y11	CRYSTAL UNIT, QUARTZ: 12.2775-mc crystal frequency; 21.4- to 21.6-mc operating frequency; Midland Mfg. Co. part no. MO 8738	290-8738-00
Y12	CRYSTAL UNIT, QUARTZ: 15.8275-mc crystal frequency; 28.5- to 28.7-mc operating frequency; Midland Mfg. Co. part no. MO 8691	290-8691-00
Y13	NOT USED	

ITEM	DESCRIPTION	COLLINS PART NUMBER
Y14	NOT USED	
Y15	CRYSTAL UNIT, QUARTZ: 453.650-kc frequency; Midland Mfg. Co. part no. MO 8705	290-8705-00
Y16	CRYSTAL UNIT, QUARTZ: 456.350-kc frequency; Midland Mfg. Co. part no. MO 8706	290-8706-00
Y17	CRYSTAL UNIT, QUARTZ: 100.000-kc frequency; Billey Electric Co.	290-8454-00
70K-2 OSCILLATOR		522-1093-00
*C301	CAPACITOR, FIXED, CERAMIC: 20 uuf $\pm 20\%$ , 500 v d-c; Centralab part no. DA933-051	913-2879-00
*C301	CAPACITOR, FIXED, CERAMIC: 20 uuf $\pm 20\%$ , 500 v d-c; Centralab part no. DA933-050	913-2880-00
*C301	CAPACITOR, FIXED, CERAMIC: 20 uuf $\pm 20\%$ , 500 v d-c; Centralab part no. DA933-049	913-2881-00
*C301	CAPACITOR, FIXED, CERAMIC: 20 uuf $\pm 20\%$ , 500 v d-c; Centralab part no. DA933-048	913-2882-00
*C301	CAPACITOR, FIXED, CERAMIC: 20 uuf $\pm 20\%$ , 500 v d-c; Centralab part no. DA933-042	913-2883-00
*C301	CAPACITOR, FIXED, CERAMIC: 20 uuf $\pm 20\%$ , 500 v d-c; Centralab part no. DA933-038	913-2884-00
*C301	CAPACITOR, FIXED, CERAMIC: 100 uuf $\pm 20\%$ , 500 v d-c; Centralab part no. DA931-022	913-2897-00
*C301	CAPACITOR, FIXED, CERAMIC: 100 uuf $\pm 20\%$ , 500 v d-c; Centralab part no. DA931-020	913-2898-00
*C301	CAPACITOR, FIXED, CERAMIC: 100 uuf $\pm 20\%$ , 500 v d-c; Centralab part no. DA932-008	913-2899-00
*C301	CAPACITOR, FIXED, CERAMIC: 100 uuf $\pm 20\%$ , 500 v d-c; Centralab part no. DA932-009	913-2900-00
C302	CAPACITOR, FIXED, MICA: 1000 uuf $\pm 1\%$ , 500 v d-c; Electro Motive part no. DM20F102F500WV	912-1749-00
C303	CAPACITOR, FIXED, MICA: 3000 uuf $\pm 10\%$ , 500 v d-c; Electro Motive part no. DM20F302F500WV	912-1748-00
C304	CAPACITOR, FIXED, MICA: 200 uuf $\pm 1\%$ , 300 v d-c; Electro Motive part no. DM15E201F300WV	912-3468-00
*C305	CAPACITOR, FIXED, CERAMIC: 100 uuf $\pm 2\%$ , 500 v d-c; Centralab part no. DA932-005	913-0074-00
*C305	CAPACITOR, FIXED, CERAMIC: 100 uuf $\pm 2\%$ , 500 v d-c; Centralab part no. DA933-017	913-0246-00
C306	CAPACITOR, FIXED, CERAMIC: 0.02 uf $\pm 60\%$ -40%, 250 v d-c; Sprague Electric Co. part no. 20C109	913-2097-00
C307	CAPACITOR, FIXED, CERAMIC: same as C306	917-1073-00
C308	CAPACITOR, VARIABLE, CERAMIC: 5.0 uuf min to 37.5 uuf max, 350 v d-c; Erie Resistor part no. 557018 COP0 39R	
C309	CAPACITOR, FIXED, CERAMIC: same as C306	913-2097-00
C310	CAPACITOR, FIXED, CERAMIC: same as C306	913-2097-00
CR301	DIODE: germanium; Sylvania part no. 1N34A	353-0103-00
L301	TRIMMER ASSEMBLY: Special	543-7323-00
L302	TRIMMER ASSEMBLY: same as L301	543-7323-00
L303	INDUCTOR, TUNING: Special	543-7333-00
L304	COIL, RADIO FREQUENCY: single layer wound, magnet wire, 3.30-uh inductance; Delevan Electronics	240-0695-00
R301	RESISTOR, COMPOSITION: 0.10 megohm $\pm 10\%$ , 1/2 w; Allen-Bradley type EB	745-1436-00
R302	RESISTOR, COMPOSITION: 82,000 ohms $\pm 10\%$ , 1/2 w; Allen-Bradley type EB	745-1433-00
R303	RESISTOR, COMPOSITION: same as R301	745-1436-00
T301	TRANSFORMER, RADIO FREQUENCY: pri. 380 uh nom, 790 kc; sec. 2.7 uh nom, 2.6 mc; Communication Coil	240-0665-00
V301	ELECTRON TUBE: type 6AU6; General Electric part no. 6AU6	255-0202-00

\*Select per operational requirement.



# 6

section

## parts list

ITEM	DESCRIPTION	COLLINS PART NUMBER
	75S-3 RECEIVER	522-2562-00
	75S-3A RECEIVER	522-2664-00
C1	CAPACITOR, FIXED, MICA: 510 uuf $\pm 5\%$ , 300 v d-c; Electro Motive part no. DM15F511J-300WV	912-2867-00
C2	CAPACITOR, FIXED, MICA: same as C1	912-2867-00
C3	CAPACITOR, VARIABLE, CERAMIC: 8 to 75 uuf, 350 v d-c; Erie Resistor Corp. part no. 557018 U2P0 34R	917-1075-00
C4	CAPACITOR, FIXED, MICA: 240 uuf $\pm 5\%$ , 500 v d-c; Electro Motive part no. DM15F241J-500WV	912-2843-00
C5	CAPACITOR, VARIABLE, CERAMIC: same as C3	917-1075-00
C6	CAPACITOR, FIXED, MICA: 100 uuf $\pm 5\%$ , 500 v d-c; Electro Motive part no. DM15F101J-500WV	912-2816-00
C7	CAPACITOR, VARIABLE, CERAMIC: same as C3	917-1075-00
C8	CAPACITOR, FIXED, CERAMIC: 0.1 uf -20% $\pm 80\%$ , 500 v d-c; Sprague Electric Co. part no. 41C92	913-3152-00
C9	CAPACITOR, VARIABLE, CERAMIC: 5 to 37.5 uuf, 350 v d-c; Erie Resistor Corp. part no. 557018 C0P0 39R	917-1073-00
C10	CAPACITOR, VARIABLE, CERAMIC: same as C9	917-1073-00
C11	CAPACITOR, FIXED, CERAMIC: 1000 uuf $\pm 100\%$ -20%, 500 v d-c; Erie Resistor Corp. part no. 851000 X5U0 102Z	913-3009-00
C12	CAPACITOR, FIXED, CERAMIC: 1.0 uuf $\pm 1/4$ uuf, 500 v d-c; Centralab	916-0070-00
C13	CAPACITOR, FIXED, CERAMIC: 10,000 uuf $\pm 100\%$ -20%, 500 v d-c; Sprague of Wisc.	913-3013-00
C14	CAPACITOR, FIXED, CERAMIC: same as C11	913-3009-00
C15	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C16	CAPACITOR, VARIABLE, CERAMIC: same as C3	917-1075-00
C17	CAPACITOR, FIXED, MICA: 510 uuf $\pm 2\%$ , 300 v d-c; Electro Motive part no. DM15F511G300WV	912-2866-00
C18	CAPACITOR, VARIABLE, CERAMIC: same as C3	917-1075-00
C19	CAPACITOR, FIXED, MICA: 220 uuf $\pm 5\%$ , 500 v d-c; Electro Motive part no. DM15F221J500WV	912-2840-00
C20	CAPACITOR, VARIABLE, CERAMIC: same as C3	917-1075-00
C21	CAPACITOR, FIXED, MICA: 68 uuf $\pm 10\%$ , 500 v d-c; Electro Motive part no. DM15E680K500WV	912-2805-00
C22	CAPACITOR, VARIABLE, CERAMIC: same as C3	917-1075-00
C23	CAPACITOR, VARIABLE, CERAMIC: same as C9	917-1073-00
C24	P/O T1	
C25	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C26	P/O T1	
C27	CAPACITOR, FIXED, MICA: 15 uuf $\pm 10\%$ , 500 v d-c; Electro Motive part no. DM15C150K500WV	912-2760-00
C28	P/O L4	
C29	CAPACITOR, FIXED, ELECTROLYTIC: 8 uf -15% $\pm 100\%$ , 6 v d-c; Sprague Electric part no. D26717	183-1167-00
C30	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C31	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C32	CAPACITOR, FIXED, CERAMIC: same as C11	913-3009-00
C33	CAPACITOR, FIXED, MICA: 220 uuf $\pm 10\%$ , 500 v d-c; Electro Motive part no. DM15F221K500WV	912-2841-00
C34	CAPACITOR, FIXED, CERAMIC: same as C11	913-3009-00
C35	P/O T7	
C36	P/O T7	
C37	CAPACITOR, FIXED, CERAMIC: same as C11	913-3009-00
C38	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C39	P/O L6	
C40	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C41	CAPACITOR, FIXED, MICA: 100 uuf $\pm 10\%$ , 500 v d-c; Electro Motive part no. DM15F101K500WV	912-2817-00
C42	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C43	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00

ITEM	DESCRIPTION	COLLINS PART NUMBER
C44	P/O T2	
C45	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C46	CAPACITOR, FIXED, MICA: 10 uuf $\pm 10\%$ , 500 v d-c; Electro Motive part no. DM15C100K500WV	912-2754-00
C47	NOT USED	
C48	CAPACITOR, FIXED, CERAMIC: same as C11	913-3009-00
C49	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C50	CAPACITOR, FIXED, PAPER: 0.05 uf $\pm 30\%$ -10%, 200 v d-c; Sangamo type 33	931-0163-00
C51	CAPACITOR, FIXED, CERAMIC: same as C11	013-3009-00
C52	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C53	CAPACITOR, FIXED, MICA: 470 uuf $\pm 10\%$ , 300 v d-c; Electro Motive part no. DM15F471K300WV	912-2865-00
C54	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C55	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C56	CAPACITOR, FIXED, ELECTROLYTIC: 100 uf -10% $\pm 75\%$ , 6 v d-c; Sprague Electric part no. D28121	183-1782-00
C57	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C58	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C59	CAPACITOR, FIXED, ELECTROLYTIC: 3 sections, 40 uf each, -10% $\pm 40\%$ , 150 v d-c; Sprague Electric part no. D27999	183-1701-00
C60	CAPACITOR, FIXED, ELECTROLYTIC: 40 uf -10% $\pm 100\%$ , 150 v d-c; P. R. Mallory and Co., Inc. part no. TC48	183-1044-00
C61	CAPACITOR, VARIABLE, CERAMIC: same as C3	917-1075-00
C62	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C63	CAPACITOR, FIXED, MICA: same as C41	912-2817-00
C64	CAPACITOR, FIXED, MICA: same as C41	912-2817-00
C65	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C66	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C67	CAPACITOR, FIXED, MICA: 20 uuf $\pm 10\%$ , 500 v d-c; Electro Motive part no. DM15C200K500WV	912-2766-00
C68	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C69	CAPACITOR, VARIABLE, CERAMIC: same as C3	917-1075-00
C70	CAPACITOR, FIXED, MICA: 200 uuf $\pm 5\%$ , 500 v d-c; Electro Motive part no. DM15F201J500WV	912-2837-00
C71	CAPACITOR, VARIABLE, CERAMIC: same as C3	917-1075-00
C72	CAPACITOR, FIXED, MICA: 130 uuf $\pm 5\%$ , 500 v d-c; Electro Motive part no. DM15F131J500WV	912-2825-00
C73	CAPACITOR, VARIABLE, CERAMIC: same as C3	917-1075-00
C74	CAPACITOR, FIXED, MICA: same as C21	912-2805-00
C75	CAPACITOR, VARIABLE, CERAMIC: same as C3	917-1075-00
C76	CAPACITOR, VARIABLE, CERAMIC: same as C3	917-1075-00
C77	CAPACITOR, FIXED, CERAMIC: same as C11	913-3009-00
C78	CAPACITOR, FIXED, MICA: same as C27; used on 75S-3 only	912-2760-00
C79	CAPACITOR, FIXED, MICA: 47 uuf $\pm 10\%$ , 500 v d-c; Electro Motive part no. DM15E470K500WV	912-2793-00
C80	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C81	CAPACITOR, FIXED, MICA: same as C1; p/o T6	912-2867-00
C82	CAPACITOR, FIXED, MICA: same as C67	912-2766-00
C83	CAPACITOR, FIXED, MICA: 120 uuf $\pm 10\%$ , 500 v d-c; Electro Motive part no. DM15F121K500WV	912-2823-00
C84	CAPACITOR, FIXED, MICA: same as C53	912-2865-00
C85	NOT USED	
C86	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C87	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C88	NOT USED	
C89	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C90	CAPACITOR, FIXED, CERAMIC: same as C11	913-3009-00
C91	P/O L4	
C92	CAPACITOR, FIXED, CERAMIC: 3 uuf $\pm 1/4$ uuf, 500 v d-c; Centralab	916-0144-00
C93	CAPACITOR, FIXED, MICA: same as C27	912-2760-00
C94	CAPACITOR, FIXED, MICA: same as C41	912-2817-00
C95	CAPACITOR, FIXED, MICA: same as C4	912-2843-00
C96	NOT USED	

SECTION 6  
Parts List

ITEM	DESCRIPTION	COLLINS PART NUMBER
C97	CAPACITOR, FIXED, CERAMIC: same as C8	913-3152-00
C98	NOT USED	
C99	NOT USED	
C100	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C101	CAPACITOR, FIXED, CERAMIC: 10,000 uuf ±20%, 1000 v d-c; Centralab Div. of Globe Union, Inc. part no. DA134-048CB	913-3922-00
C102	CAPACITOR, FIXED, CERAMIC: 0.05 uf +80% -20%, 500 v d-c; Sprague Electric part no. 33C58 P O T8	913-3153-00
C103	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C104	CAPACITOR, FIXED, CERAMIC: same as C11	913-3009-00
C105	CAPACITOR, FIXED, MICA: same as C53	912-2865-00
C106	CAPACITOR, FIXED, ELECTROLYTIC: 10 uf -10% +100%, 150 v d-c; P. R. Mallory and Co., Inc. part no. TC42	183-1040-00
C107	P O T8	
C108	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C109	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C110	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C111	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C112	CAPACITOR, FIXED, CERAMIC: same as C101	913-3922-00
C113	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C114	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C115	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C116	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C117	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C118	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C119	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C120	CAPACITOR, FIXED, MICA: same as C27	912-2760-00
C121	CAPACITOR, FIXED, MICA: same as C41	912-2817-00
C122	CAPACITOR ASSEMBLY, VARIABLE, MICA: 7 uuf min, 80 uuf max, 350 v d-c; Electro Motive part no. T50410, capacitor: T16328, bracket (includes C126, C127)	918-0058-00
C123	CAPACITOR ASSEMBLY: same as C122	918-0058-00
C124	CAPACITOR, FIXED, MICA: 82 uuf ±10%, 500 v d-c; Electro Motive part no. DM15E820K500WV	912-2811-00
C125	CAPACITOR, FIXED, MICA: 33 uuf ±10%, 500 v d-c; Electro Motive part no. DM15E330K500WV	912-2781-00
C126	P O C122	
C127	P O C122	
C128	CAPACITOR, FIXED, MICA: 33 uuf ±10%, 500 v d-c; Electro Motive part no. DM15E330K500WV	912-2799-00
C129	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C130	CAPACITOR, FIXED, CERAMIC: same as C13	913-3009-00
C131	CAPACITOR, FIXED, MICA: same as C128	912-2799-00
C132	P O Q Multiplier	
C133	P O Q Multiplier	
C134	P O Q Multiplier	
C135	CAPACITOR, FIXED, CERAMIC: same as C11	913-3009-00
C136	NOT USED	
C137	CAPACITOR, FIXED, PAPER: same as C50	931-0163-00
C138	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C139	NOT USED	
C140	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C141	CAPACITOR, FIXED, MICA: 180 uuf ±10%, 500 v d-c; Electro Motive part no. DM15F180K500WV	912-2835-00
C142	CAPACITOR, FIXED, MICA: same as C141	912-2835-00
C143	P O BFO (L10)	
C144	P O BFO (L10)	
C145	P O BFO (L10)	
C146	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C147	CAPACITOR, FIXED, CERAMIC: same as C13	913-3013-00
C148	CAPACITOR, FIXED, MICA: same as C27	912-2760-00
CR1	SEMICONDUCTOR DEVICE, DIODE: silicon, axial lead mtd; metal and glass case, hermetically sealed; 400 v peak inverse voltage, General Electric part no. 1N1490	353-1659-00
CR2	SEMICONDUCTOR DEVICE, DIODE: same as CR1	353-1659-00
CR3	SEMICONDUCTOR DEVICE, DIODE: same as CR1	353-1659-00
CR4	P O BFO Assembly (L10)	
CR5	SEMICONDUCTOR DEVICE, DIODE: silicon, hermetically sealed; Hughes Aircraft	353-2762-00
DS1	LAMP, INCANDESCENT: 6.3 v, 0.15 amp, 1-1/8 in. lg, clear; General Electric part no. 47	262-3240-00
F1	FUSE, CARTRIDGE: 2 amp, 250 v d-c; ferrule terminal; Littelfuse Inc. part no. 312002	264-4070-00
FL1	FILTER, BAND PASS: 455.0-kc operating fre- quency, 300-cycle bandwidth; Midland Mfg. Co. part no. M3-0843	293-0843-00
FL2	FILTER, BAND PASS: 455.0-kc operating fre- quency, 454.30- to 455.70-kc bandwidth	526-9337-00
J1	JACK, TIP: accommodates 1/8 in. plug; ceramic insulation, brass contacts; Cinch Mfg. Corp. part no. 201-11-01-018	360-0088-00

ITEM	DESCRIPTION	COLLINS PART NUMBER
J2	JACK, TIP: same as J1	360-0088-00
J3	NOT USED	
J4	NOT USED	
J5	JACK, TIP: same as J1	360-0088-00
J6	JACK, TELEPHONE: spring leaf contacts, J1-1B contact arrangement; Switchcraft, Inc. part no. 13E	360-0136-00
L1	NOT USED	
L2	NOT USED	
L3	TRANSFORMER AND COIL ASSEMBLY: 3.055-mc frequency, 25/32 in. by 25/32 in. by 2.875 in. overall; Communications Coil part no. X-185-1A and X-185-1B	278-1721-00
L4	COIL, RADIO FREQUENCY: 10,000 uh, 66.5 ohms d-c; resistance, 75 ma current, no. 22 AWG tinned copper leads (includes C28, C91); Delevan part no. 2500-76	240-2564-00
L5	COIL, RADIO FREQUENCY: single layer wound, 10-uh inductance; Jeffers Electronics, Div. of Speer Carbon Co. part no. 10102-32	240-0149-00
L6	REACTOR: 1 coil, 3.0-hy inductance, 0.120-amp current, 100 ohms resistance (includes C39); Chicago Standard Transformer Corp. part no. 11272	668-0020-00
L7	COIL, RADIO FREQUENCY: 1000 uh, 16 ohms d-c resistance, 135 ma current, 700 v rms; Delevan Electronics part no. 2500-28	240-2540-00
L8	TRANSFORMER, INTERMEDIATE FREQUENCY: 455 kc; 1-1/4 in. by 1-19/64 in. by 4-3/8 in.; Communications Coil Co. part no. X-565-1	278-0653-00
L9	TRANSFORMER, INTERMEDIATE FREQUENCY: 455 kc; 25/32 in. by 25/32 in. by 3 in. over-all dimensions; Communications Coil Co. part no. X-004-2	278-0277-00
L10	TRANSFORMER, RADIO FREQUENCY: 200 turns litz wire, 1/4 pi wound, 25/32 in. by 25/32 in. by 3 in. overall (includes C143, C144, C145, CR4 and R80); Communications Coil Co. part no. X-453-1	278-0655-00
L11	NOT USED	
L12	COIL, RADIO FREQUENCY: 500 uh, 11 ohms d-c resistance, 170 ma current, 700 v rms; Delevan Electronics part no. 2500-14	240-2533-00
L13	NOT USED	
L14	COIL, RADIO FREQUENCY: 3 pi wound, 225 turns ea, 2.0 mh, no. 40 AWG; Delevan Electronics part no. BS-123	240-0084-00
L15	COIL, RADIO FREQUENCY: same as L14	240-0084-00
L16	COIL, RADIO FREQUENCY: 100 uh, 3.2 ohms d-c resistance, 530 ma current, 700 v rms; Jeffers Electronics Div. of Speer Carbon Co. part no. 10404-34	240-0193-00
M1	VOLTMETER: panel, d-c; meter range 0-1 ma, 0-250 v, 50 scale divisions; Simpson Electric type 127B	458-0044-00
P1	DUMMY LOAD, ELECTRICAL: 100 ohms im- pedance, 1 2 w; 1.2 in. dia by 1.139 in. lg overall; (includes R41)	544-3143-002
P2	NOT USED	
P3		
P4		
P5	CABLE ASSEMBLY, SPECIAL PURPOSE, ELEC- TRICAL: 3 conductors no. 18 AWG; 125 v rms working voltage; 0.325 in. dia by 6 ft 0.843 in. lg v a; one end terminated w. plug connector; Belden Mfg. Co. KH3491	426-1464-00
P6	POWER CONNECTOR: 11 female contacts (see W1); Amphenol Borg part no. 78-S11M-1005	372-1952-00
R1	RESISTOR, FIXED, COMPOSITION: 3.3 megohms ±10%, 1 2 w; Allen-Bradley type EB	745-1499-00
R2	RESISTOR, FIXED, COMPOSITION: 47,000 ohms ±10%, 1 2 w; Allen-Bradley type EB	745-1422-00
R3	RESISTOR, FIXED, COMPOSITION: 1000 ohms ±10%, 1 2 w; Allen-Bradley type EB	745-1352-00
R4	RESISTOR, FIXED, COMPOSITION: 0.22 megohm ±10%, 1 2 w; Allen-Bradley type EB	745-1450-00
R5	RESISTOR, FIXED, COMPOSITION: same as R3	745-1352-00
R6	RESISTOR, FIXED, COMPOSITION: same as R3	745-1352-00
R7	RESISTOR, FIXED, COMPOSITION: 68,000 ohms ±10%, 1/2 w; Allen-Bradley type EB	745-1429-00
R8	RESISTOR, FIXED, COMPOSITION: 68,000 ohms ±10%, 1 2 w; Allen-Bradley type EB	745-1303-00
R9	RESISTOR, FIXED, COMPOSITION: same as R3	745-1352-00
R10	RESISTOR, FIXED, COMPOSITION: same as R3	745-1352-00
R11	RESISTOR, FIXED, COMPOSITION: 0.10 megohm ±10%, 1 2 w; Allen-Bradley type EB	745-1436-00
R12	RESISTOR, FIXED, COMPOSITION: same as R8	745-1303-00



### 5.1 Frequency Coverage.

Both the 75S-3 and the 75S-3A Receivers are capable of receiving on any frequency within the range of 3.4 to 30.0 mc. Receiver coverage is in increments of 200 kc for each bandswitch setting. The 75S-3 is equipped with 14 crystal sockets, selectable from the front panel. The 75S-3A is equipped with 28 crystal

sockets, selectable from the front panel. With the 12 crystals furnished, both receivers provide complete coverage of 80 meters, 40 meters, 20 meters, 15 meters, WWV at 15 mc, and the 28.5- to 28.7-mc portion of the 10-meter band. Remaining crystal sockets may be used for additional 10-meter coverage. Other crystals may be substituted for those furnished to provide coverage at other frequencies throughout the range.

### 5.2 Equipment Characteristics.

Power requirements. . . . .	115 volts, 50 to 60 cps. Power consumption is approximately 90 watts. Power may be provided by an external supply which delivers 150 volts d-c at 125 ma and -70 volts d-c at 5 ma. Filament power may be a-c or d-c as follows: 6 to 7 volts at 5.5 amperes, 12 to 14 volts at 2.75 amperes, or 24 to 28 volts at 1.375 amperes.
Frequency range. . . . .	3.4 to 30.0 megacycles. With crystals furnished, bands are as follows: 3.4 to 3.6 mc, 3.6 to 3.8 mc, 3.8 to 4.0 mc, 7.0 to 7.2 mc, 7.2 to 7.4 mc, 14.0 to 14.2 mc, 14.2 to 14.4 mc, 14.8 to 15.0 mc, 21.0 to 21.2 mc, 21.2 to 21.4 mc, 21.4 to 21.6 mc, and 28.5 to 28.7 mc.
Mode . . . . .	Selectable single sideband, CW, or AM.
Sensitivity . . . . .	0.5 microvolt for 10-db signal-plus-noise to noise ratio in SSB mode.
Selectivity . . . . .	SSB: 2.1 kc at 6 db down, 4.2 kc at 60 db down. CW: 0.2 kc at 6 db down, 1.25 kc at 60 db down. AM: 4.5 kc at 6 db down, 25 kc at 60 db down.
Spurious response . . . . .	Image rejection better than 50 db. Internal spurious signals below one microvolt equivalent antenna input.
Frequency stability . . . . .	Within 100 cps after warmup.
Dial accuracy . . . . .	Better than one kc on any band after midband calibration.
S-meter calibration. . . . .	Approximately S-9 with 100-uv antenna input signal.
Audio output requirements. . . . .	Speaker: 3 to 4 ohms. Headphones: 500 ohms or higher.
Audio output level. . . . .	0.25 watt at age threshold. 1.8 watts maximum.
Size . . . . .	7-3/4 in. high, 14-3/4 in. wide, 12-1/2 in. deep.
Weight. . . . .	20 pounds.



### 5.3 Tube, Fuse, Lamp, And Semiconductor Complement.

TABLE 5-1. TUBES, FUSES, LAMPS, AND SEMICONDUCTORS

SYMBOL	FUNCTION	TYPE	SYMBOL	FUNCTION	TYPE
V1	Crystal calibrator	6DC6	V9	AM detector, agc rectifier, audio amplifier	6AT6
V2	R-f amplifier	6DC6			
V3A	First mixer	6EA8	V10	Audio output	6BF5
V3B	Crystal oscillator	6EA8	V11	Tunable BFO	6DC6
V4A	Second mixer	6EA8	V301	VFO	6AU6
V4B	Cathode follower	6EA8	CR1, CR2	Power rectifiers	1N1490
V5	Q-multiplier	12AX7	CR3	Bias rectifier	1N1490
V6	First i-f amplifier	6BA6	CR4	BFO tuning	HC7004
V7	Second i-f amplifier	6BA6	CR5	Voltage regulator	1N732
V8A	Product detector	6EA8	CR301	Switch	1N34A
V8B	Crystal BFO	6EA8	DS1, DS2	Dial lamps	47
			F1	Power supply fuse	2 amp

### 5.4 Available Accessories.

TABLE 5-2. AVAILABLE ACCESSORIES

ITEM	FUNCTION	COLLINS PART NUMBER
312B-3 Speaker	Station speaker	522-1166-00
312B-4 Station Control	Speaker, phone patch, directional wattmeter, and station control switches.	522-1167-00
351E-1 Mounting Plate	Table mount for 75S-3/3A.	522-1479-00
351E-2 Mounting Plate	Table mount for 312B-4.	522-1480-00
351E-3 Mounting Plate	Table mount for 312B-3.	522-1481-00
351R-1 Rack Mount	Rack mount for 75S-3/3A.	522-2665-00
351R-2 Rack Mount	Rack mount for 312B-4.	522-2666-00
Extra crystals	Additional band coverage.	See Parts List.
F455Y-31 Filter	3.1-kc band-pass filter.	526-9338-00
F455Y-40 Filter	4.0-kc band-pass filter.	526-9339-00
F455Y-60 Filter	6.0-kc band-pass filter.	526-9340-00
Filter Installation Kit	Parts for filter installation.	549-5095-00



**instruction book**

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**75S - 3 and 75S - 3A**  
**Receivers**

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75S-3  
75S-3A

# section 1

## installation

### 1.1 Unpacking.

Lift the receiver out of the carton and packing material. Examine for visible damage. If the receiver has been damaged in shipment, save the box and packing material, and notify the transportation company. Complete and mail the equipment registration card. Check tubes and crystals for proper seating in sockets. Check tuning controls and switches for freedom of action. Check that the special Mu-Metal shields are in place on tube V11 and coil L10 (see figure 4-1). Check the equipment included with the receiver against table 1-1.

### 1.2 Cabling.

1.2.1 EXTERNAL CONNECTIONS. Figure 1-1 shows the location of jacks for external connections to 75S-3 and 75S-3A receivers. The power cable plugs into socket J13. The ANT jack is a nominal 50-ohm antenna input. The 4  $\Omega$  AUDIO jack is for connection of a speaker.



DO NOT connect the a-c power cord to the 115-volt a-c line until power plug P6 has been plugged into J13. To avoid damage to the receiver, make sure the key on P6 is properly aligned with the keyway on J13.

To connect the receiver for mute operation, a means of supplying a ground while receiving must be applied to the MUTE jack. Opening this circuit mutes the receiver. A set of normally closed contacts on a relay which is keyed with the transmitter may be used for this purpose. To use this circuit, the receiver must be operated in the STBY position.

The CW SIDETONE jack is a high-impedance, low-level audio input (0.2 volt rms, typical) to the receiver. Audio from a sidetone oscillator may be applied to this

TABLE 1-1. EQUIPMENT FURNISHED WITH 75S-3/3A

QUANTITY	DESCRIPTION	FUNCTION	PART NUMBER
2	Phono-type connectors	External connections	361-0062-00
1	Fuse, 2-ampere	Spare	264-4070-00
1	Power cord	A-c power	544-3121-00
1	Power plug adapter	A-c power	368-0138-00
1	Instruction book	75S-3/3A instructions	523-0148-00
1	Logbook	Station logging	523-0755-820
1	Cable marker card	Cable identification	280-2946-00
1	No. 4 Bristo wrench	Accessory tool	024-2900-00
1	No. 6 Bristo wrench	Accessory tool	024-9730-00
1	No. 8 Bristo wrench	Accessory tool	024-0019-00
1	No. 10 Bristo wrench	Accessory tool	024-9710-00



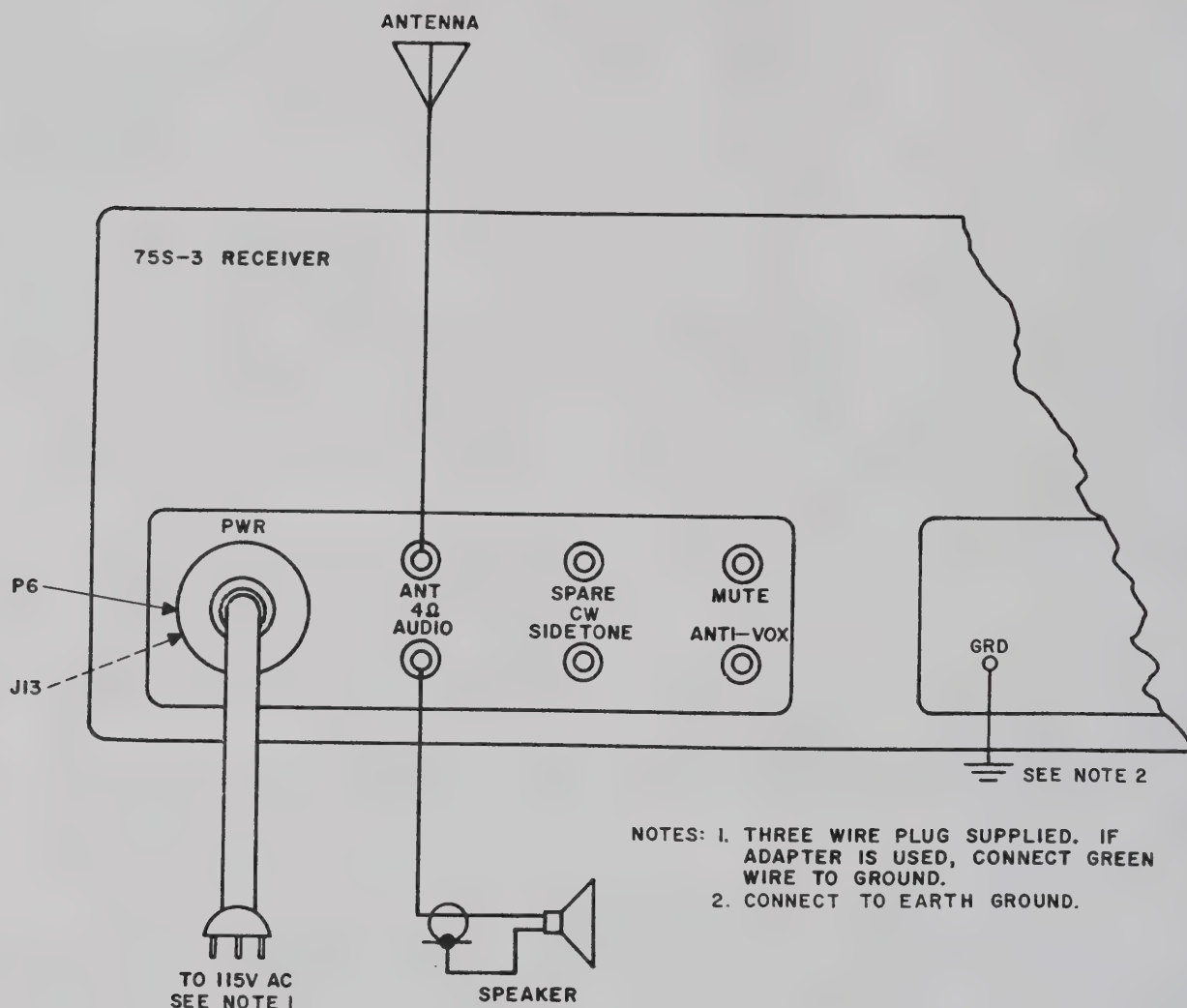


Figure 1-1. External Connections

jack to provide a cw monitoring circuit through the receiver audio system.

The ANTI-VOX jack is a 500-ohm audio output from the receiver. At normal speaker volume levels, 5 to 10 volts rms is provided at this output. This voltage is normally applied to anti-vox circuits in an associated transmitter.

The PHONES jack on the front panel is connected through a resistive network to a 500-ohm tap on the output transformer. Therefore, best results will be obtained if headphones used are 500 ohms or higher impedance. The speaker is silenced when headphones are plugged in.

1.2.2 CABLING WITH 32S-3 TRANSMITTER. Figure 1-2 shows a complete station interconnection for a 75S-3 or 75S-3A Receiver, 32S-3 Transmitter, and

312B-4 Station Control. The RG-58C/U cables indicated are slightly larger in diameter and two inches shorter than the audio and control cables. If the 312B-4 is not used, connect a 4-ohm speaker, such as the 312B-3, to 4Ω AUDIO jack on receiver. Connect ANTI-VOX jack on receiver directly to ANTI-VOX jack on transmitter. Omit PHONE PATCH and PTT connections.

To connect the 75S-3 or 75S-3A and the 32S-3 for transceiver operation, use the patch cables furnished with the transmitter, and connect as follows:

a. Connect the 32S-3 and 75S-3/3A as shown in figure 1-2.

b. Remove P1 from XMTR XTAL OSC jack J7 (under 32S-3 top cover), and plug it into 32S-3 RCVR XTAL OSC jack J6. Remove the 100-ohm dummy load plug from the 75S XTAL OSC OUTPUT jack, and plug it into 32S-3 XMTR XTAL OSC jack J7.

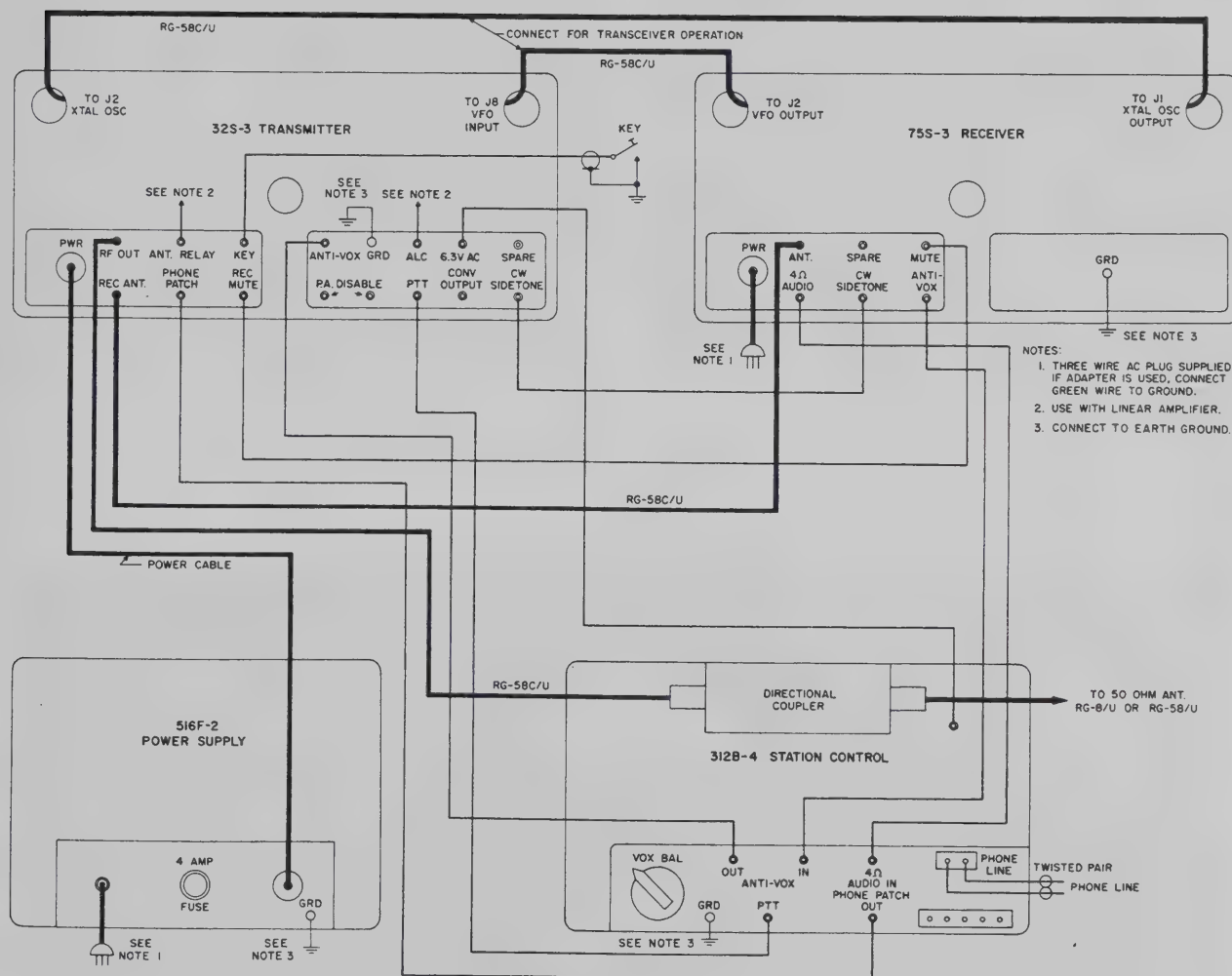


Figure 1-2. Station Interconnections

## SECTION 1

### Installation

**1.2.3 CABLING WITH KWM-2/2A TRANSCEIVER.**  
The 75S-3/3A may be used with a KWM-2/2A to provide separate transmit and receive frequencies. Connect the patch cables as follows:

- a. Using an RG-58C/U patch cable, connect REC ANT jack on KWM-2/2A to ANT jack on 75S-3/3A.
- b. Connect the 500  $\Omega$  jack on the KWM-2/2A to the ANTI-VOX jack on the 75S-3/3A. If a 312B-4 or 312B-5 is used, connect the KWM-2/2A 500 $\Omega$  jack to ANTI-VOX IN and the 75S-3/3A ANTI-VOX jack to ANTI-VOX OUT on the 312B-4/5.
- c. Connect the REC MUTE jack J20 on the KWM-2/2A to the MUTE jack on the 75S-3/3A.

The station speaker may be plugged into either the 4  $\Omega$  jack on the KWM-2/2A or the 4  $\Omega$  AUDIO jack on the 75S-3/3A. For normal mute operation, set the 75S-3/3A function switch to STBY. Receiver output from the KWM-2/2A is turned off by setting AF GAIN to zero. For transmit and receive operation on the same frequency, reduce the 75S-3/3A AF GAIN to zero, and operate the KWM-2/2A in a normal manner.

### 1.2.4 CABLING WITH OTHER TRANSMITTERS.

- a. To provide receiver muting when using 75S-3/3A with KWS-1, connect a cable from pins 5,6 on J102 (receiver disable) in the transmitter to MUTE jack on the receiver. Connect a cable from receiver ANTI-VOX jack to pin 7 on J102 (500-ohm audio) in the KWS-1. Connect cable shield to ground.
- b. To use the 75S-3/3A with the 32V-3, connect a cable from the receiver MUTE jack to receiver disabling pins 24 and 25 on the transmitter.
- c. To use the 75S-3/3A with other makes of transmitters, connect muting, cw sidetone, and anti-vox provisions in the receiver as applicable. The requirements for use are outlined in paragraph 1.2.1.

### 1.3 Initial Checks.

Lift the top cover, and make sure the dummy load (see figure 4-1) is plugged into the XTAL OSC OUTPUT jack unless the receiver is connected for transceiver operation. Recheck the interconnections to make sure the patch cables are plugged into the appropriate jacks. Be sure that RG-58C/U cables, rather than the audio and control cables, have been used for all r-f applications. Check to ensure the special Mu-Metal shields are in place on tube V11 and coil L10.



# section 2

## operation

### 2.1 Calibration.

- After making external connections, set controls as shown in figure 2-1.
- Set BAND switch (11) to desired frequency range. If receiver is 75S-3A, set crystal board selector (10) so desired set of bands appears in window.
- Set dial to 0, 100, or 200 with tuning knob (3).
- Adjust PRESELECTOR (2) for maximum signal or noise output.
- Tune back and forth near 0, 100, or 200 until calibrate signal is at zero beat.
- Adjust zero set knob (4) until dial is calibrated.

### 2.2 Single-Sideband Tuning.

- Set controls as shown in figure 2-1, except set function switch (1) to OPR, and the BFO knob fully counterclockwise until a click is heard.
- Set EMISSION switch (12) to desired sideband.
- Adjust PRESELECTOR (2) for maximum signal or noise output.
- Tune in signal and adjust AF GAIN (9) for desired audio output level.

When listening to strong signals, a reduction in background noise under no-modulation conditions may be

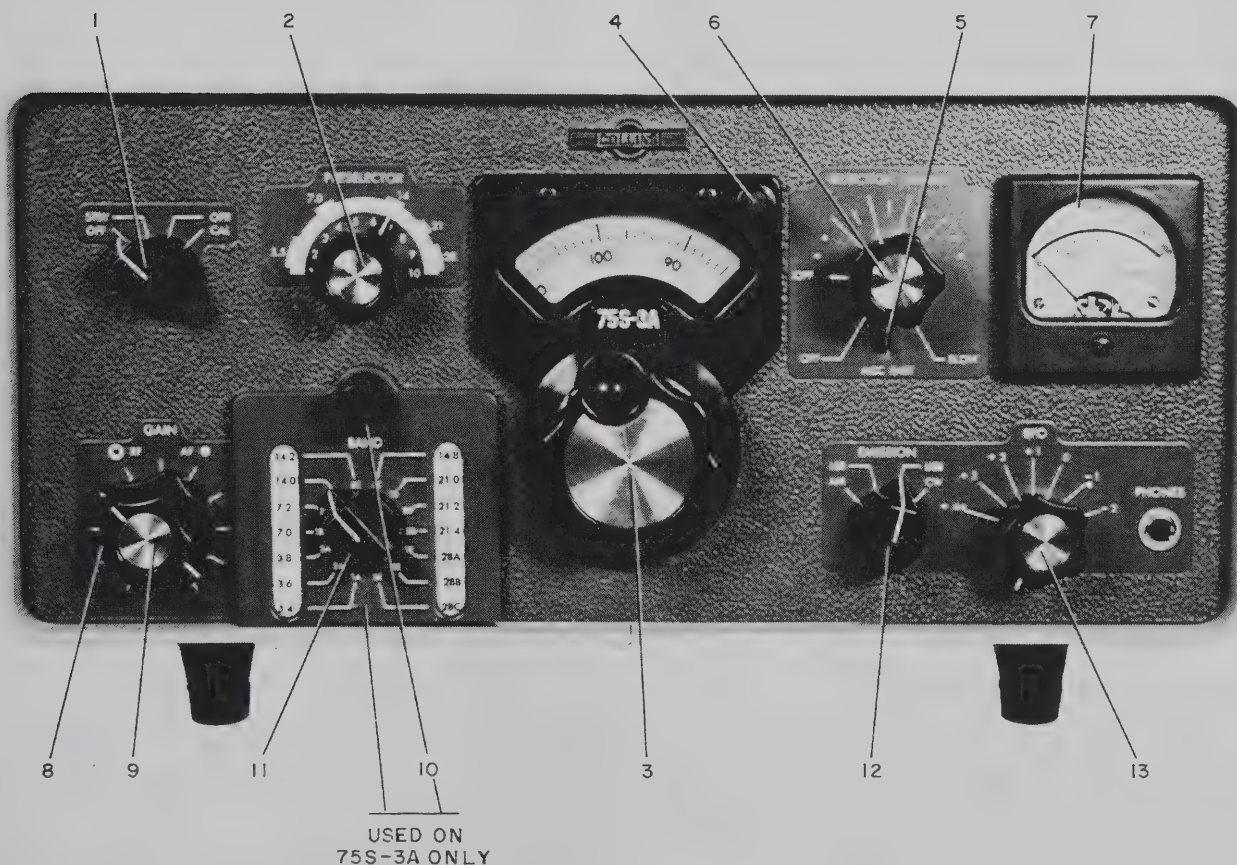


Figure 2-1. Operating Controls

## SECTION 2

### Operation

obtained by rotating RF GAIN control (8) counterclockwise, away from the maximum position. As this is done, S-meter (7) static reading will shift upscale. At proper gain control setting, meter will kick about one or two S-units on peaks. For example, if the weakest of the desired signals is peaking at S-9, set gain control so that static meter reading is S-7 to S-8. This retains accurate meter readings.

To read frequency, add the dial setting to the BAND switch setting. For example, if the BAND switch is set to 3.8 and the dial is set to 5, the frequency is 3.805 mc. If the BAND switch is set to 3.8 and the dial to 170, the frequency is 3.970 mc.

#### 2.3 CW Tuning.

a. Set controls as outlined in paragraph 2.2 except set EMISSION switch to CW.

b. Rotate the BFO knob (13) clockwise to energize the tunable bfo. Set to either +1 or -1.

c. Adjust BFO knob to yield the most pleasing beat note with the desired signal centered in the filter pass band.

d. Read approximate frequency as follows: When BFO knob is set to the plus side of zero, add kilocycle reading from bfo scale to dial reading. Subtract bfo reading for minus settings of the knob. If a precision reading is desired, set the BFO knob, and recalibrate the main tuning dial using the crystal calibrator. When the main dial is calibrated in this manner, further adjustment of the BFO knob or switching to the crystal-controlled BFO requires recalibration of the dial.

Either fast or slow AGC (5) may be used, or it may be turned off. If AGC is turned off, decrease RF GAIN control setting to prevent receiver overloading. Adjust AF GAIN control to provide desired audio level. In general, it is best to set r-f gain at a point just below that which causes signal to overload receiver. This provides optimum sensitivity.

Tuning may be facilitated by switching first to USB to tune in the desired signal and then switching to CW to reduce interference. The beat note will be the same in either position. The wider pass band provided in USB is also useful for net operation.

#### 2.4 AM Tuning.

a. Set controls as outlined in paragraph 2.2.

b. Set EMISSION switch to AM.

c. Set AGC switch to FAST.

d. Tune in signal, and adjust AF GAIN for desired audio output level.

If desired, SSB methods may be used for AM reception. Set EMISSION switch to either USB or LSB position; use tuning procedure for a single-sideband signal. Once the desired signal is tuned in, switching to the opposite sideband may yield a more readable signal. This method of reception is useful under conditions of severe interference or extreme fading.

#### 2.5 RTTY Tuning.

This type of operation requires an external RTTY converter and printer. Tune receiver as follows:

a. Set controls for SSB reception as outlined in paragraph 2.2 with EMISSION switch in USB position.

b. Turn on tunable bfo by rotating BFO knob (13) clockwise.

c. Set the pointer on the BFO tuning knob at the dot near -1 on the calibrated scale.

d. Tune the receiver for maximum S-meter reading on the desired RTTY signal.

e. Fine adjustment of the BFO tuning knob then will produce 2125 cps and 2975 cps mark and space signals at the receiver audio output. To reverse the mark and space signals, reset the BFO tuning knob to the dot near +4 on the calibrated scale.

#### 2.6 Rejection Tuning.

An interfering heterodyne or cw signal may be reduced in level or eliminated by operation of the REJECTION TUNING knob (6). The off position for this control is at the end of extreme counterclockwise rotation. The on-off switch is provided with a positive stop rather than a detent. Do not force the knob. Clockwise rotation of the knob from the off position moves the rejection notch across the receiver pass band. It is recommended that the operator familiarize himself with the operation of this control by tuning the notch across the signal from the crystal calibrator.

When the receiver is initially placed in operation, it may be necessary to touch up the adjustment of R77. Refer to paragraph 4.5.8.

#### 2.7 Use of S-Meter.

The S-meter is intended primarily to indicate relative rather than absolute signal strength. A nominal meter reading of S-9 is obtained with an input signal of 100 microvolts. The threshold of agc operation is set at the factory to a nominal value of 1.5 microvolts. Due to normal tolerances in receiver operation, agc threshold varies slightly from band to band causing correspondingly slight changes in the number of db represented by each S-unit. The db scale is calibrated with 1 microvolt as a reference; therefore, an S-9 signal of 100 microvolts represents a 40-db increase over the reference signal level. Since agc is not applied to very weak signals, S-zero is arbitrarily established at 10 db on the scale. Typical meter readings, therefore, can represent from 3.3 to slightly over 4 db per S-unit. A figure of 4 db can be taken as an average.

#### 2.8 Transceiver Operation with 32S-3 Transmitter.

a. Make sure patch cables are connected as outlined in paragraph 1.2.2.

b. Set FREQ CONTROL (1) on 32S-3 to REC VFO position.

c. Set OFF-STBY-OPR-CAL switch on 75S-3/3A to STBY position.

d. Set both BAND selectors to the same desired band and both EMISSION switches to the same position (either USB, LSB or CW).

e. Tune both receiver and transmitter as in normal operation. Both transmit and receive functions operate from the receiver vfo; the transmitter vfo is not used



in transceiver operation. Switching the transmitter **FREQ CONTROL (1)** back to **TRANS VFO** position will allow separate operation of the two units within the same 200-kc band.

## NOTE

In CW transceiver operation, the 75S variable bfo will have to be used to obtain the desired beat note if it is desired to transmit zero beat with another station.

**CAUTION**

When operating in transceiver service, do not operate the transmitter while the receiver is tuned outside band limits; the transmitted signal will be out of the band. Do not attempt operation with receiver and transmitter set on different 200-kc bands, even when operating in **TRANS VFO** position. With patch cables connected for transceiver operation, the receiver h-f crystal oscillator controls injection frequency to the transmitter second mixer.

If operation on different 200-kc bands is desired (that is, receive on one 200-kc band and transmit on another), remove the transceiver patch cables and operate the units as in normal independent operation.

If transmitted frequency is changed by any great amount, be sure to redip the PA plate current and check the loading. This will be most important on the 80- and 40-meter bands.

Some operating experience will indicate the amount of frequency excursion possible without readjustment.

Do not attempt operation in transceiver service with any other receiver not having the same frequency mixing scheme.

f. To restore both units to normal operation, remove the two patch cables connecting oscillator signals, replace P1 in J7 on the transmitter slug rack (under top cover), and replace the 100-ohm load plug in the receiver XTAL OSC OUTPUT jack.

**2.9 Operation Outside Amateur Bands.**

Additional 10-meter band coverage, or coverage outside the amateur bands may be obtained by plugging an appropriate crystal into the crystal mounting board. Two extra sockets are provided in the mounting board for this purpose. The total 3.4- to 30.0-megacycle coverage available is divided into five segments, designated A, B, C, D, and E. The frequency range of each of these segments is listed in the total coverage column of table 2-1. The letter portions of the crystal socket locations shown in figure 2-2 indicate which sockets may be used for crystals to cover a 200-kc band within a specific total coverage segment. For example, crystals for extended 10-meter coverage must be plugged into sockets marked E.

The proper crystal for coverage of a specific 200-kc band may be selected as follows:

a. If the lower edge of the desired band is 11.8 mc or less, the required crystal frequency is equal to the

TABLE 2-1. CRYSTAL FREQUENCIES AND OPERATING BANDS

BAND-SWITCH POSITION	FREQUENCY BAND	CRYSTAL SUPPLIED	CRYSTAL SOCKET CONNECTED	TOTAL COVERAGE
1A - 3.4 2A - 3.6 3A - 3.8	3.4 - 3.6 mc 3.6 - 3.8 mc 3.8 - 4.0 mc	6.555 mc 6.755 mc 6.955 mc	1A 2A 3A	A 3.4 - 5.0 mc
1B - 7.0 2B - 7.2	7.0 - 7.2 mc 7.2 - 7.4 mc	10.155 mc 10.355 mc	1B 2B	B 6.5 - 9.5 mc
1C - 14.0 2C - 14.2 3C - 14.8	14.0 - 14.2 mc 14.2 - 14.4 mc 14.8 - 15.0 mc	8.5775 mc 8.6775 mc 8.9775 mc	1C 2C 3C	C 9.5 - 15.0 mc
1D - 21.0 2D - 21.2 3D - 21.4	21.0 - 21.2 mc 21.2 - 21.4 mc 21.4 - 21.6 mc	12.0775 mc 12.1775 mc 12.2775 mc	1D 2D 3D	D 15.0 - 22.0 mc
1E - 28A 2E - 28B 3E - 28C	28.5 - 28.7 mc As selected As selected	15.8275 mc Not supplied Not supplied	2E 2E 3E	E 22.0 - 30.0 mc



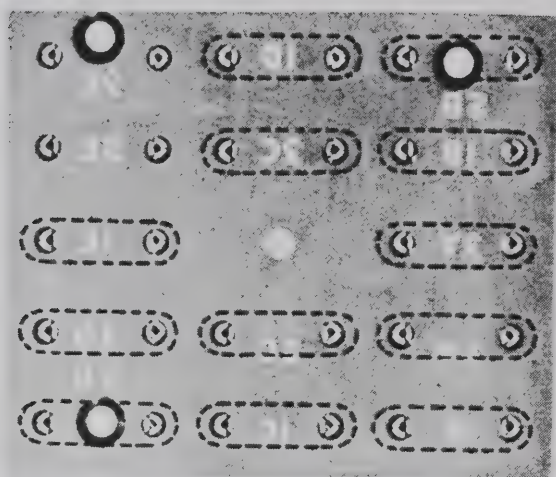


Figure 2-2. Crystal Socket Locations

lower edge of the desired band plus 3.155 mc. For example, if the desired band is 4.0 to 4.2 mc, the required crystal frequency is 7.155 mc.

b. If the lower edge of the desired band is 12.0 mc or higher, the required crystal frequency is equal to half the sum of the desired lower band edge and 3.155 mc. For example, if the desired band is 14.4 or 14.6 mc, the required crystal frequency is 8.7775 mc.

Extra crystals available are listed in section 6, Parts List.

Approximate settings for the PRESELECTION are shown in figure 2-3. For example, if coverage from 10.0 to 10.2 mc is desired, plug the appropriate crystal into a socket marked C, turn the BAND switch to that position, and set the PRESELECTION to approximately 3.2 on the logging scale. Peak the PRESELECTION tuning as in normal operation. The ANT, RF, and OSC trimmer capacitors (those marked C in the example above) may also be peaked if optimum performance is desired at frequencies outside the amateur bands. On some bands it is possible to peak the PRESELECTION tuning at an image frequency or at a different order of output frequency from the crystal oscillator; however, there is only one correct setting for coverage within a given 200-kc band.

The above information also applies to the 75S-3A except that two crystal mounting boards are provided in this receiver. The amateur-band board is located under the chassis. To obtain access, refer to paragraph 4.1. When crystal board selector (10) is switched to extended coverage position, the above-chassis board is switched into the circuit. The crystal socket locations are the same for both boards. Space is provided in the window adjacent to the BAND switch to mark in-band information. A pencil may be used to allow erasure if changes are made.

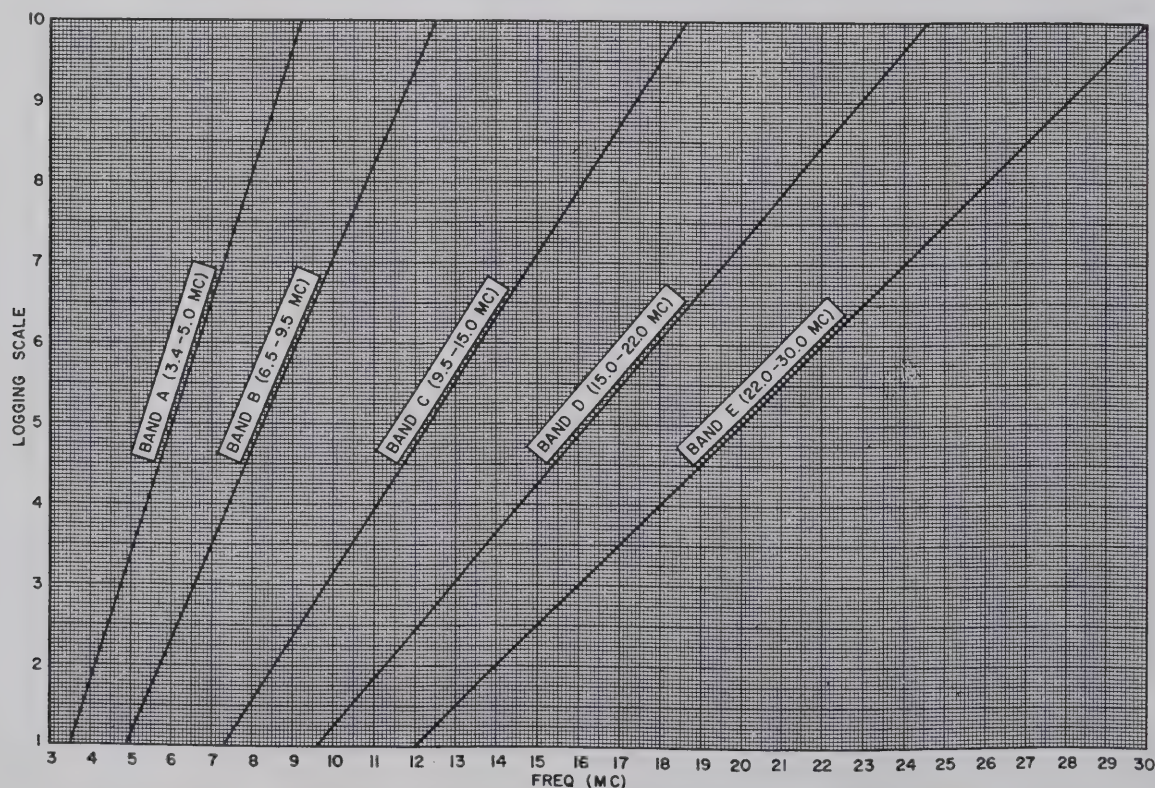


Figure 2-3. Preselector Calibration Curves



## principles of operation

### 3.1 Block Diagram.

Figure 3-1 is a block diagram for 75S-3 and 75S-3A Receivers. Double conversion is used, with injection voltage for the first conversion provided by a crystal-controlled oscillator. A band-pass i-f, 200 kilocycles wide, is used to couple the first and second mixers. Injection voltage for the second mixer is furnished by a vfo with a tuning range of 200 kc. The 455-kc output frequency of the second mixer is coupled through the i-f system to separate AM and SSB detectors. Injection voltage for the product detector is provided by either a crystal-controlled bfo or a tunable bfo. The 75S-3A is identical to the 75S-3 except that it is equipped with an extra h-f crystal mounting board on the chassis, a crystal board selector switch on the front panel, and associated components. Figure 7-1 is a schematic diagram for both receivers, with circuit differences noted.

### 3.2 R-F and Mixer Circuits.

The r-f amplifier grid, high-frequency mixer grid, and crystal oscillator plate circuits are resonated by slug-tuned coils. The slugs are mechanically ganged and linked to the PRESELECTOR tuning knob. The required tuning ranges of these circuits are obtained by switching appropriate values of fixed capacitance in parallel with the coils. The total 3.4- to 30-mc tuning range of the receiver is divided into five segments for band-switching purposes, as noted in table 2-1. The tuned circuit LC ratio is thereby varied within appropriate limits for each of the five segments.

Signals within the particular 200-kc band selected are amplified by V2, the r-f amplifier, and coupled to the control grid of V3A, the first mixer. Injection voltage is coupled to the cathode of V3A. Products of mixing are selected in the plate circuit of V3A, tuned to 3.155 to 2.955 mc which is the band-pass i-f frequency. Signals are coupled to the control grid of second mixer V4A with vfo injection voltage applied to the cathode of this tube.

### 3.3 Oscillator Circuits.

**3.3.1 CRYSTAL OSCILLATORS.** High-frequency crystal oscillator V3B provides injection voltage for the first mixer. The crystal oscillator output frequency is always 3.155 mc higher than the lower edge of the selected band. On bands below 12.0 mc, the oscillator plate circuit is tuned to the crystal frequency. At 12.0 mc and higher, the plate circuit is tuned to the second harmonic. The secondary winding of T2 couples injection voltage to the first mixer cathode circuit and furnishes a d-c return

to ground for mixer tube V3A. Dummy load R41 stimulates the load presented by the 32S-3 Transmitter when connected for transceiver operation.

Crystal-controlled bfo V8B and associated circuitry furnishes injection voltage for the product detector. Crystals Y15 and Y16 provide the proper bfo frequency relationships to the mechanical filter passband to yield optimum audio response from the product detector. Crystal Y15 is used for lower sideband reception, and Y16 is used for upper sideband. Capacitor C95 and coil L-12 form a broadly resonant circuit at 455 kc. Oscillator voltage is developed across R49 and coupled by C100 to the cathode of V8A, the product detector tube.

The crystal calibrator circuit provides marker signals at multiples of 100 kc. Variable capacitor C61 provides for adjustment to zero beat with WWV. The output of this oscillator is coupled to the receiver antenna circuits.

**3.3.2 VARIABLE OSCILLATORS.** The vfo uses fixed capacitance and variable inductance to produce the required tuning range of 2.5 to 2.7 mc. Capacitor C303, in the frequency-determining network, is paralleled by variable capacitor C308 in series with diode CR301. This diode switches C308 in or out of the circuit, depending upon the polarity of a bias voltage impressed across the diode junction. The bias voltage is coupled to the diode through R303, and is positive in the USB position causing CR301 to switch C308 into the circuit. When C308 is properly adjusted, it shifts the vfo frequency by an amount equal to the frequency separation of crystals Y15 and Y16. This allows either sideband to be selected without retuning or recalibrating the dial. The vfo output voltage is coupled to the cathode of second mixer tube V4A and to the control grid of cathode follower V4B. The cathode follower prevents loading of the vfo circuits by cable capacity when operated in transceiver service.

Tube V11 and associated circuitry comprise a tunable bfo. The bfo tuning control is potentiometer R81. This control varies a positive d-c voltage applied to the junction of voltage-variable capacitor CR4. The junction capacity of this device is proportional to applied voltage. Adjustment of R81 therefore varies the output frequency of the bfo. Voltage for the tuning circuit is stabilized by a regulator consisting of Zener diode CR5 and resistor R82. Switch S13 completes the cathode circuit of either V8B or V11 thus turning on the desired bfo

## SECTION 3

### Principles of Operation

and turning off the other. The output circuits of both oscillators are coupled to the product detector.

#### 3.4 I-F And Detector Circuits.

Output from the second mixer is coupled to either one of two band-pass filters or 455-kc tuned circuits. A mechanical filter with 2.1-kc nominal bandwidth is provided for SSB reception. A band-pass crystal filter with 250 cps nominal bandwidth is selected in the CW position. For AM reception, two cascaded 455-kc transformers provide increased bandwidth. Output from these circuits is coupled through the Q-multiplier to the first i-f amplifier, V6. The cathode of V6 is returned to ground through potentiometer R57 which is used to set the gain of this stage at a point producing the proper agc threshold. The S-meter circuit is connected from the screen circuits of V6 and V7, the two i-f amplifiers, to the cathode of V7. Under no-signal conditions, the voltage developed across R13 is equal to that developed across R17, and the meter reads zero. Application of agc causes the cathode current of V7 and the combined screen current of V6 and V7 to decrease. The voltage across R17 increases, the voltage across R13 decreases, and the meter reads up-scale by an amount which is proportional to signal strength. Output voltage from the second i-f amplifier is coupled to the product detector, V8A. It is also coupled to separate AM and agc diode detectors. Injection voltage is applied to the cathode of the product detector.

#### 3.5 Q-Multiplier And Notch Filter.

The notch filter is composed of coil L8 and associated capacitors and resistors. The rejection notch occurs at the resonant frequency of this circuit and is centered at 455 kc. Capacitor C132 is mechanically coupled to the REJECTION TUNING control which allows the notch frequency to be moved across the receiver i-f passband. Potentiometer R77 is adjusted to provide optimum Q and depth of notch. Switch S10 shorts the filter circuit in the OFF position. The Q-multiplier is a feedback circuit which includes L8. This circuit multiplies the Q of L8 approximately ten times, thereby obtaining a much deeper and narrower rejection notch than would be provided by the filter alone. The notch shape provided by this circuit allows unwanted signals to be rejected with minimum disturbance to desired signals.

#### 3.6 AGC And Control Circuits.

Signal voltage is coupled from the secondary of transformer T6 to one of the diode plates in V9 and rectified. Agc voltage is developed across R24, the diode load resistor, and is applied to the r-f and i-f amplifier stages. Signal voltage is filtered from the agc line by R50 and C49. Generation of agc voltage is delayed until the signal voltage at the diode plate exceeds the cathode bias on V9. Potentiometer R57 in the cathode

of the first i-f amplifier tube is normally adjusted so that agc action is initiated with a receiver input signal of approximately 1.5 microvolts. This point is referred to as agc threshold. Agc time constant is determined by the amount of capacitance placed in parallel with R24. Added capacity in the SLOW position of the AGC selector produces a slower release characteristic.

Manual control of r-f gain is also accomplished through the agc line. A voltage divider circuit, consisting of resistors R33, R55, and RF GAIN control R56, is connected across the negative 65-volt bias line. At the maximum gain setting, this circuit places a one-volt static bias on the agc line to furnish proper operating bias for r-f amplifier V2. At lower control settings, increased bias is provided which reduces the gain. The d-c grid return for the first mixer stage and MUTE jack J11 are connected to the junction of resistors R33 and R58. When the receiver function switch is placed in the STBY position, a ground at J11 causes the receiver to operate in a normal manner. Removal of this ground causes cutoff bias to be applied to the mixer grid and increased bias on the agc line, thus muting the receiver.

#### 3.7 Audio Circuits.

Audio voltage from the appropriate detector is selected by S8A on the EMISSION switch, and is coupled to the AF GAIN control. The CW SIDETONE jack, J10, is also connected to this point. A sidetone audio voltage of approximately 0.2 volt will produce a normal listening level at average gain settings. Audio is amplified in a two-stage amplifier consisting of tubes V8 and V10. Three audio outputs are provided. Jack J8 is a 4-ohm outlet for a speaker. The headphone jack is connected to a resistive divider across the 500-ohm tap on the output transformer. The divider provides a load for V10 when the impedance of headphones used is relatively high. The ANTI-VOX jack, J12, is also connected to the 500-ohm tap. At normal audio gain settings, 5 to 15 volts of audio are available at J12 for use with the anti-vox circuits in an associated transmitter.

#### 3.8 Power Supply Circuits.

The internal power supply furnishes filament, plate, and bias voltages for the receiver. Bias voltage is obtained by rectifying a portion of the a-c voltage appearing from one leg of the high-voltage secondary to ground. The tube filaments and pilot lamps are connected in a way which allows operation from a 6-, 12-, or 24-volt source. Filament, plate, and bias voltages may be furnished by an external source such as a mobile power supply. Figure 7-1 illustrates the proper connections to the power plug for this type of operation.



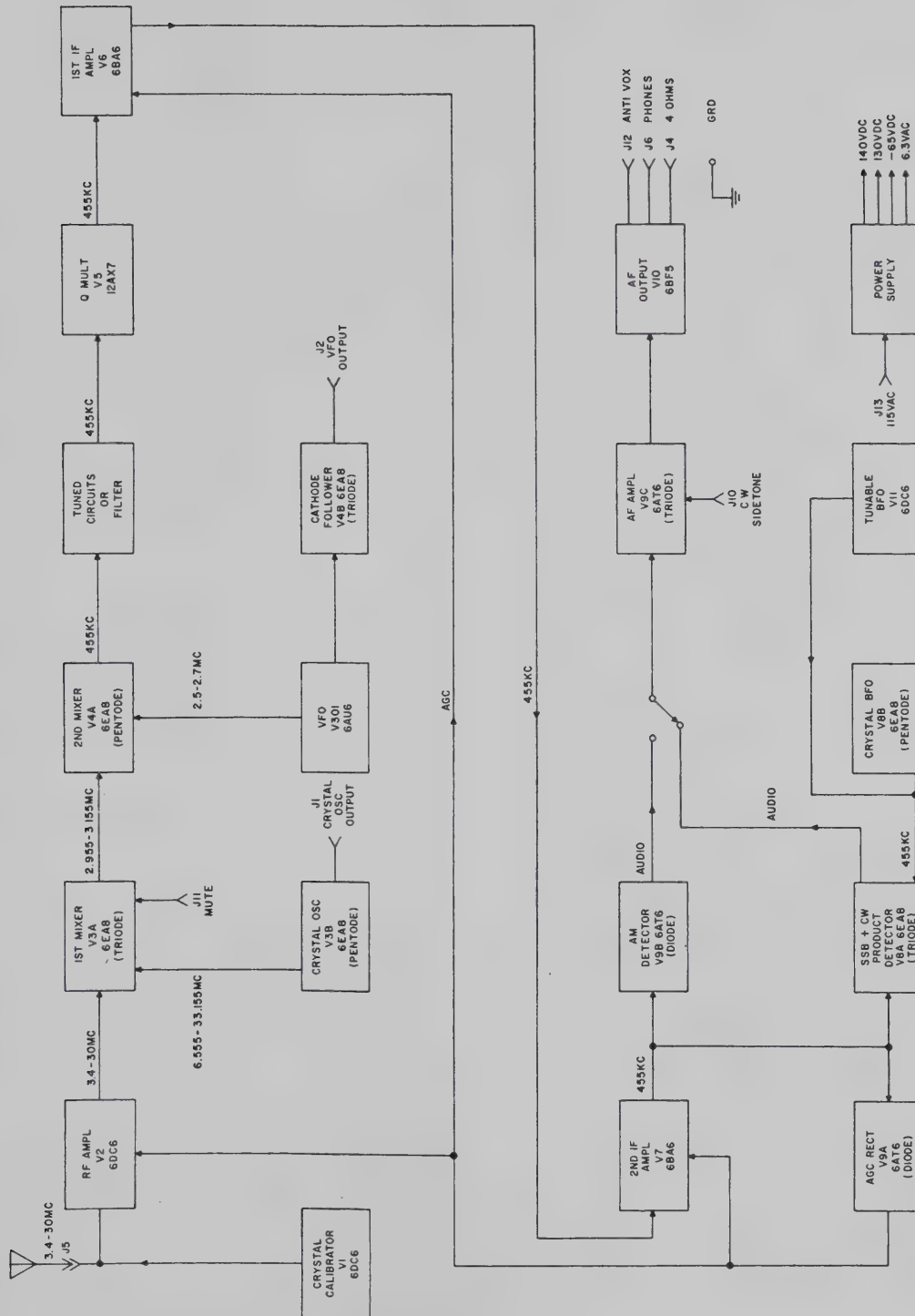


Figure 3-1. Block Diagram

John 2nd  
TRAVIS

Not Run (8)  
755-3/31  
~~LET~~

## service instructions

### 4.1 General.

This section covers maintenance and service of 75S-3 and 75S-3A Receivers. It includes information on trouble analysis, signal tracing procedures, voltage and resistance measurements, and alignment procedures. The usefulness of signal level and alignment data given depends upon the accuracy of the test equipment used. Minor adjustments in alignment may be made using the crystal calibrator as a signal source. Except for an occasional touch-up to compensate for possible component aging, alignment normally will be necessary only if frequency-determining components have been replaced. If servicing requires that the cabinet be removed, proceed as follows:

- a. Disconnect all power and external connections.
- b. Lift the lid, and remove the two screws located at the front edge of the cabinet.
- c. Remove the four feet and the screw located midway between the rear feet.
- d. From the rear, push the receiver chassis forward until the front panel protrudes from the cabinet about an inch.
- e. Grasping the front panel at the edges, slide the receiver out of the cabinet.

### NOTE

DO NOT lubricate the 70K-2 vfo shaft bearings or the dial drive system bearings. The vfo shaft bearings are lubricated at the factory with a special grease. Dial bearings are the Oilite type which are self-lubricating.

Tube filaments and pilot lamps are connected in series-parallel arrangements for 12- or 24-volt operation. When making tube or lamp replacements, be sure that rated filament currents are the same as the original units.

### 4.2 Trouble Analysis.

Most cases of trouble can be traced to defective tubes. Many tube checkers can not duplicate the conditions under which the tubes work in the receiver. Substitution of new tubes will sometimes clear an obscure case of tube trouble. Intermittent trouble conditions in tubes can usually be discovered by lightly tapping the envelope. Occasionally, tube pins or socket terminals will become dirty or

corroded causing an intermittent condition. When this situation is suspected, remove the tube and apply a few drops of contact cleaner to the tube pins. Replace the tube, and work it up and down in the socket a few times. Shorted tubes or capacitors will often cause associated resistors to overheat and crack, blister, or discolor. Making the measurements listed in table 4-1 will help to isolate this type of trouble to a particular stage or component.

A logical process of elimination in conjunction with a study of the main schematic diagram, block diagram, and section 3 will aid in isolating trouble. For example, if the receiver functions properly in the AM position but fails to operate in the SSB or CW positions, trouble in the product detector should be suspected because this circuit is not used for AM reception. As a further check, both beat-frequency oscillators should be alternately switched into the circuit to see if one has failed. A third possibility would be that both beat oscillators have failed.

If the receiver is to be returned to the factory or an authorized service agency, a detailed report of operational difficulties will assist the servicing agency in making repairs with a minimum of time and expense. This is particularly important when intermittent trouble is involved.

### 4.3 Voltage And Resistance Measurements.

Table 4-1 lists typical voltage and resistance readings at each tube socket terminal except those of the vfo tube, V301. Do not open the vfo can. Make all measurements under the following conditions:

- a. Unless otherwise noted in the table, set RF GAIN at maximum, AF GAIN at minimum, EMISSION switch in USB position, function switch in OPR position, tunable bfo off, REJECTION TUNING OFF, and AGC in the FAST position.
- b. Voltage measurements are made with power connected.
- c. Resistance measurements are made with all external cables, including power cable, disconnected. Resistances of less than one ohm are listed as zero.
- d. Make all measurements from indicated socket terminal to chassis ground.

It is recommended that a vtvm be used for these measurements. A vom may be used if it has an input resistance of not less than 20,000 ohms per volt. Voltage measurements made with a vom will yield lower readings in high impedance circuits such as the agc line. Do not use a vom for r-f measurements.



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Service Instructions

TABLE 4-1. VOLTAGE AND RESISTANCE MEASUREMENTS

TUBE	TUBE SOCKET TERMINAL								
	1	2	3	4	5	6	7	8	9
V1 CAL ON DCV CAL OFF DCV ACV OHMS	-52 0 1 MEG	+0.7 52 1000*	0 0	6.3 0	105 142 230K**	51 142 220K**	0 0 0		
V2 DCV ACV OHMS	-0.8 6 MEG	0 0	0 0	6.3 0	138 18K** ①	72 60K**	0 0		
V3 DCV ACV OHMS	112 18K** ①	-11 100K	130 17K** ①	0 0	6.3 0	130 17K** ①	0 0	3.6 1000	0 230K
V4 DCV ACV OHMS	120 18K** ①	0 82	120 18K** ①	6.3 0	0 0	120 19K** ①	4.4 1000	5.4 680	2.7 100K
V5 DCV ACV OHMS	138 18K** ①	-0 100K	1.1 680	0 0	0 0	143 18K** ①	0 340K	1.1 680	6.3 0
V6 DCV ACV OHMS	-0.8 3.7 MEG	0 0	0 0	6.3 0	138 0	74 19K** ①	2.2 22K ①		
V7 DCV ACV OHMS	-0.8 3.6 MEG	0 0	0 0	6.3 0	138 19K** ①	72 23K** ①	0.62 85		
V8 DCV ACV OHMS	46 120K**	-3.2 1 MEG	48 240K**	6.3 0	0 0	112 20K** ①	0 0 ②	0 5	-2.7 5600
V9 DCV ACV OHMS	1.1 680K	2.7 12K	6.3 0	0 0	-0.9 3.5 MEG	0 CW, SB 23 AM ∞ CW, SB 220K AM	100 120K**		
V10 DCV ACV OHMS	-11 250K	0 0	6.3 0	0 0	127 18K** ①	122 18K** ①	-11 250K		
V11 ON DCV OFF DCV ACV OHMS	-2 0 47K	0 25 0 ③	6.3 0	0 0	128 128 20K** ①	30 128 38K**	0 0 0		

\*FUNCTION switch in CAL position

\*\*Resistance may vary depending upon diode and electrolytic condition

① Reverse VOM leads and take highest of the two readings

② Tunable BFO switch OFF

③ Tunable BFO switch ON

TABLE 4-2. SIGNAL LEVELS

SIGNAL INJECTION POINT	GENERATOR OUTPUT FREQUENCY	GENERATOR OUTPUT VOLTAGE	NORMAL INDICATION
V10 - pin 1	1000 cps	5.4 volts	1-watt audio output
V9 - pin 1	1000 cps	0.2 volt	1-watt audio output
V8 - pin 9	455 kc	75 millivolts	1-watt audio output
V8 - pin 6	BFO INJECTION		1.65 volts r-f (each bfo)
V7 - pin 1	455 kc	48 millivolts	Agc threshold
V6 - pin 1	455 kc	175 microvolts	Agc threshold
V4 - pin 6	455 kc	1400 microvolts	Agc threshold
V4 - pin 7	VFO INJECTION		2.0-2.5 r-f volts
V4 - pin 2	3.055 mc	100 microvolts	Agc threshold
V3 - pin 8	HF OSC INJECTION		0.8-2.0 r-f volts
V3 - pin 9	14.1 mc	30 microvolts	Agc threshold
V2 - pin 1	14.1 mc	9 microvolts	Agc threshold
J5 (ANT)	14.1 mc	1.5 microvolts	Agc threshold

#### 4.4 Signal Tracing.

Appropriate test points and normal signal levels are listed in table 4-2. The values listed are nominal. Signal levels in a given receiver may differ from those listed by a factor of plus or minus 20 percent without noticeable degradation in performance. A signal generator with an accurately calibrated output attenuator must be used to provide the r-f signal source voltages indicated. A Hewlett-Packard model 606A or equivalent generator is recommended for this purpose. Be sure to consult the signal generator instruction book for information regarding output termination requirements. Measurements of oscillator injection voltages require the use of an r-f vtm such as the Hewlett-Packard model 410B. Make r-f and audio measurements under the following conditions:

a. For audio measurements, use an audio oscillator as the signal source and an a-c vtm or calibrated oscilloscope to monitor receiver audio output. If desired, an audio wattmeter may be used. Set AF GAIN at maximum, and terminate the 4 $\Omega$  AUDIO output with a four-ohm resistive load.

b. Oscillator injection voltages are measured with an r-f vtm. Measure from cathode to chassis ground at the associated mixer or product detector tube.

c. To check r-f signal levels, connect a d-c vtm to the receiver agc line. Set RF GAIN at maximum. Static d-c voltage on the agc line should be approximately -1.0 volt. Connect the r-f signal generator to the point indicated in the table, and rock the generator dial to produce maximum agc voltage. Starting from minimum output, increase signal generator output to the point where a further increase in signal produces a slight increase in agc voltage. This is agc threshold. Note generator output voltage, and compare with the value listed in the table.

#### 4.5 Alignment Procedure.

Complete alignment of the receiver may be accomplished using the crystal calibrator as a signal source and the S-meter as a peak indicator. To provide a variable output attenuator for the calibrator, connect a .001-uf capacitor to one end of a 5000-ohm carbon potentiometer. Temporarily connect the free end of the capacitor to tube socket terminal 5 of V1, the crystal calibrator. Connect the rotating contact of the potentiometer to ground. Figure 4-1 shows the location of adjustments except for the filter input and output trimmer capacitors. These trimmers are located under the chassis adjacent to the mechanical and crystal filters. The

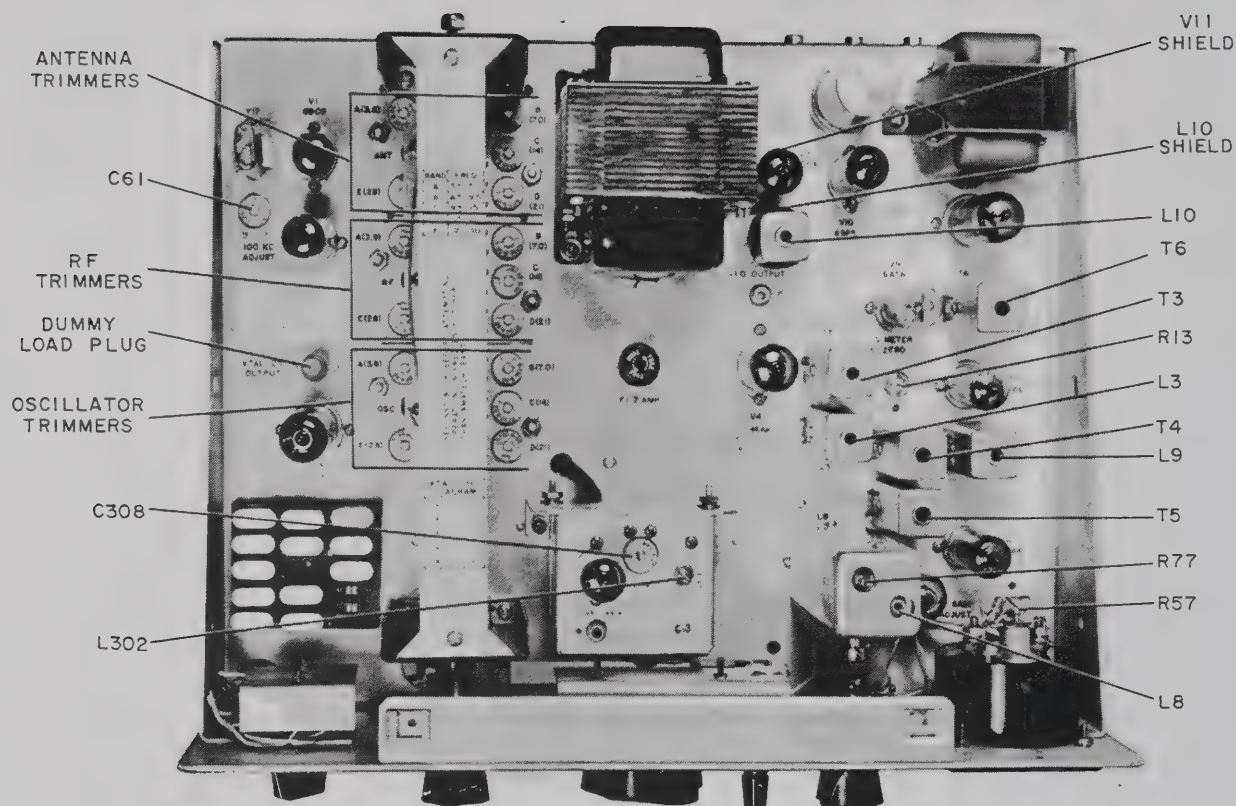


Figure 4-1. Location of Adjustments

rotary ceramic trimmers used in the receiver are at maximum capacity when the large notch is positioned midway between the two mounting screws. Rotation in either direction from this position reduces capacity with minimum being at 180 degrees from maximum.

#### 4.5.1 455-KILOCYCLE I-F ALIGNMENT.

- a. Set EMISSION switch to USB, and tune to the calibrate signal at 3.7 mc.
- b. Adjust calibrator output attenuator to provide S-meter reading of approximately S-3.
- c. Adjust the slugs of L9 and T6 for peak meter reading. Reduce calibrator output as necessary to maintain a low meter reading. Repeat L9 and T6 adjustments.
- d. Adjust C122 and C123, SSB filter input and output trimmers, for peak meter reading.
- e. Switch to CW position, and adjust C126 and C127, CW filter input and output trimmers, for

peak meter reading. Rock receiver tuning dial to make sure signal is centered in filter passband.

- f. Switch to AM position, and adjust top and bottom slugs of T4 and T5 for peak meter reading. This completes alignment.

- g. If a signal generator is used for this alignment, remove vfo tube V301, connect generator to pin 2 of V4, and adjust frequency to center of filter pass band. Align as outlined above, disconnect generator, and replace V301.

#### 4.5.2 BAND-PASS I-F ALIGNMENT.

- a. Set EMISSION switch to CW, and tune to the calibrate signal at 3.7 mc.
- b. Make two swamping networks by connecting a .01-uf capacitor in series with a 1000-ohm resistor and connecting alligator clips to the two remaining leads.



- c. Connect one swamping network from T3 primary (terminal 1) to ground and the other from L3 (terminal 1) to ground.
- d. Adjust attenuator to provide meter reading of approximately S-3.
- e. Peak the secondary of T3 (top of can) using a Walsco 2543 or equivalent type tuning tool.
- f. Remove both swamping networks and swamp T3 secondary (terminal 3 to ground). Peak T3 primary (bottom of can), and peak L3.
- g. Remove swamping network from T3 secondary. This completes band-pass i-f alignment.
- h. If a signal generator is used for this alignment, disable the h-f crystal oscillator by removing the crystal for the 3.6-mc band. Connect the signal generator to the XTAL OSC OUTPUT jack, and set to 3.055 mc. Tune receiver to the generator signal at approximately 100 on the dial. Align as above, disconnect generator, and replace crystal.

#### 4.5.3 R-F CIRCUIT ALIGNMENT.

- a. Tune to the calibrate signal at 3.7 mc with the EMISSION switch in either USB or LSB position. Connect a 47-ohm resistor or a dummy load such as the DL-1 to the 75S-3/3A ANT jack. During the following procedures, adjust the calibrator output attenuator as necessary to maintain a meter reading of approximately S-3.
- b. Set both A (3.8) RF and ANT trimmer capacitors so the large notches point to approximately 2 o'clock when viewed as shown in figure 4-1. Set the A (3.8) OSC trimmer so the large notch points to the rear of the chassis.
- c. Set the PRESELECTOR to 2.1 on the logging scale.
- d. Adjust the OSC, RF, and ANT slugs located on the movable platform the maximum S-meter indication. Adjust the OSC slug first. After making these adjustments, make sure the PRESELECTOR tuning peaks at 2.1 on the logging scale.
- e. Set BAND switch to 28A, PRESELECTOR to 8.9 on the logging scale, and tune to the calibrate signal at 28.6 mc. Maintain S-3 signal level.
- f. Adjust E (28) OSC, RF, and ANT trimmer capacitors for peak S-meter reading. Adjust OSC trimmer first.
- g. Set BAND switch to 21.0 and PRESELECTOR to 7.9 on the logging scale. Tune to calibrate signal at 21.1 mc. Maintain S-3 signal level.
- h. Adjust D (21) OSC, RF, and ANT trimmers for peak S-meter reading. Adjust OSC trimmers first.
- i. Set BAND switch to 14.8 and PRESELECTOR to 7.0 on the logging scale. Tune to calibrate signal at 14.9 mc. Maintain S-3 signal level.
- j. Adjust C (14) OSC trimmer for peak S-meter reading.
- k. Set BAND switch to 14.2 and PRESELECTOR to 6.6 on the logging scale.
- l. Adjust C (14) RF and ANT trimmers for peak meter reading. Maintain S-3 signal level.

- m. Set BAND switch to 7.0 and PRESELECTOR to 3.9 on the logging scale. Tune to calibrate signal at 7.1 mc. Maintain S-3 signal level.
- n. Adjust B OSC, RF, and ANT trimmers for peak S-meter reading. Adjust OSC trimmer first.
- o. Disconnect the crystal calibrator output attenuator. This completes r-f alignment.
- p. If signal generator and r-f vtm are used for this alignment, connect the generator output to the receiver ANT jack. Set generator output to frequencies listed, and align RF and ANT trimmers as outlined in preceding steps. Connect r-f vtm to XTAL OSC OUTPUT jack on bottom side of chassis, leaving load plug P1 in place. Align OSC trimmers as indicated except adjust for peak reading on the vtm. In step k, adjust PRESELECTOR near 6.6 on logging scale at the point where vtm reading peaks.

#### 4.5.4 VFO SIDEBAND FREQUENCY SHIFT ADJUSTMENT.

Set EMISSION switch to LSB, and tune to zero beat with calibrate signal at 3.7 mc. Without further movement of the dial, switch to USB, and adjust C308 (on vfo) for zero beat.

#### 4.5.5 CRYSTAL CALIBRATOR ADJUSTMENT.

- a. Set receiver for AM reception, and tune to WWV at 15.0-mc at a time when the station is not transmitting tone.
- b. Turn function switch to CAL position. Set 100 KC ADJUST trimmer C61 for zero beat of the calibrate signal against WWV.

#### 4.5.6 VFO DIAL CALIBRATION.

Calibrate the dial at 100. If zero beat with the calibrate signal does not occur at 0 and 200 +1 kc on the dial, there is end-point spread. If there is no end-point spread, but the hairline is not vertical when the dial is calibrated, a mechanical adjustment only is required. Refer to step h in the following procedure. To correct for end-point spread, make the following adjustments:

- a. Set BAND switch to any band and function switch to CAL, and tune calibrate signal to zero beat at 200 end of the dial.
- b. Set hairline to 200 with zero set knob.
- c. Tune calibrate signal to zero beat at 0 end of the dial. Note the difference in kilocycles between the hairline and dial 0 (example: -1.5 kc).
- d. Without moving the hairline, move the dial to the opposite side of 0 by an amount equal to the frequency difference noted above (example: +1.5 kc).
- e. Adjust L302 for zero beat. It is located on top of the vfo can.
- f. Set the hairline at 0 with zero set knob.
- g. Tune the calibrate signal to zero beat at the 200-end of the dial. If zero beat does not occur at exactly 200, repeat steps b through e.

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### Service Instructions

h. After adjustment of end points, if the hairline is not vertical in the dial window, loosen the set-screws on the dial hub, and move the dial relative to the oscillator shaft so that, at zero beat, the dials reads 0 to 200 with the hairline vertical.

i. After these adjustments of the vfo calibration, make the vfo sideband frequency shift adjustment as outlined in paragraph 4.5.4.

#### 4.5.7 TUNABLE BFO ALIGNMENT.

a. Make sure the BFO tuning knob is correctly positioned on the shaft. At the control end stops, the knob pointer should be at approximately 7 o'clock (ccw end) and 5 o'clock (cw end).

b. Rotate BFO knob to extreme counterclockwise.

c. Turn on calibrator and tune receiver to zero beat in USB position.

d. Turn on tunable bfo, and set BFO knob to 0.

e. Adjust L10 for zero beat.

#### 4.5.8 NOTCH FILTER ALIGNMENT.

a. Check REJECTION TUNING knob position. Pointer should be at OFF when the knob is at the counterclockwise stop. Leave at OFF position.

b. Tune to the calibrate signal on a band which provides a calibrate signal level of approximately S-9 plus

20 db in either USB or LSB position. Center signal in filter passband (approximately 1350-cps tone).

c. Set REJECTION TUNING knob to midscale (pointer vertical).

d. Alternately adjust L8 and R77 for maximum depth of notch as indicated by minimum S-meter reading. If the Q-multiplier exhibits a tendency to ring or oscillate, back off slightly on R77.

#### 4.5.9 I-F GAIN ADJUSTMENT.

To set i-f gain control R57, a signal generator with a calibrated output attenuator is required. Connect the signal generator to the receiver ANT jack, and adjust to 1.5 microvolts output at 28.6 mc. Tune the receiver to the generator signal, and adjust R57 to the point which produces a just-perceptible increase above the no-signal reading on the S-meter. Do not make this adjustment until receiver alignment has been completed.

#### 4.5.10 S-METER ZERO ADJUSTMENT.

a. Set receiver to the middle of any operating band, and peak PRESELECTOR for maximum output.

b. Set RF GAIN to maximum, and short ANT jack to ground.

c. Set S-METER ADJUST (R13) so S-meter reads zero.

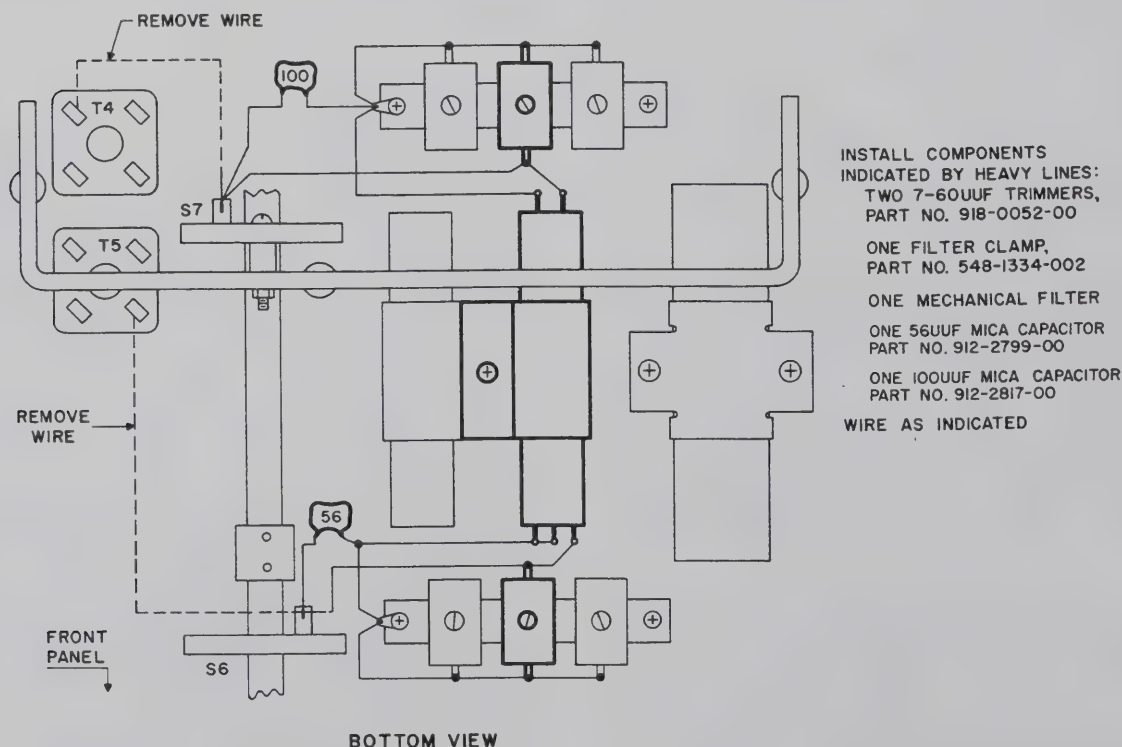


Figure 4-2. Optional Filter Installation Diagram

#### 4.6 Installation of Optional Filters.

Space is provided in the 75S-3/3A to install accessory filters in place of the 455-kc transformers used in the AM function. Figure 4-2 shows the placement of parts and required wiring changes.

To obtain access to the front trimmer-mounting strip, remove the long strip located behind the front panel and fastened by machine screws to the brackets for the front cabinet feet. Bend the mounting tabs on the new trimmer capacitors slightly toward each other, snap the trimmers into place on the trimmer-mounting strips, and solder the appropriate lugs to the ground buses as shown in figure 4-2. Install the filter as shown. If necessary, bend the new filter

clamp slightly to provide a good fit around the filter. One end of the filter has three terminals, one of which has no insulation around it. This is the case ground. Connect this terminal and either one of the two remaining terminals to chassis ground. Either of the terminals on the opposite end of the filter may be used for the ground connection indicated. Dress the new wiring carefully to prevent shorts. Where needed, use spaghetti from removed wiring.

When installation and wiring are completed, turn the receiver on, and tune to the calibrate signal at 14.0 mc. Adjust the filter trimmer capacitors for maximum S-meter reading with the signal centered in the filter passband. Available filters and installation kit of parts are listed in table 5-2.





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**1.1 Unpacking.**

Lift the receiver out of the carton and packing material. Examine for visible damage. If the receiver has been damaged in shipment, save the box and packing material, and notify the transportation company. Complete and mail the equipment registration card. Check tubes and crystals for proper seating in sockets. Check tuning controls and switches for freedom of action. Check that the special Mu-Metal shields are in place on tube V11 and coil L10 (see figure 4-1). Check the equipment included with the receiver against table 1-1.

**1.2 Cabling.**

**1.2.1 EXTERNAL CONNECTIONS.** Figure 1-1 shows the location of jacks for external connections to 75S-3 and 75S-3A receivers. The power cable plugs into socket J13. The ANT jack is a nominal 50-ohm antenna input. The 4  $\Omega$  AUDIO jack is for connection of a speaker.

**CAUTION**

DO NOT connect the a-c power cord to the 115-volt a-c line until power plug P6 has been plugged into J13. To avoid damage to the receiver, make sure the key on P6 is properly aligned with the keyway on J13.

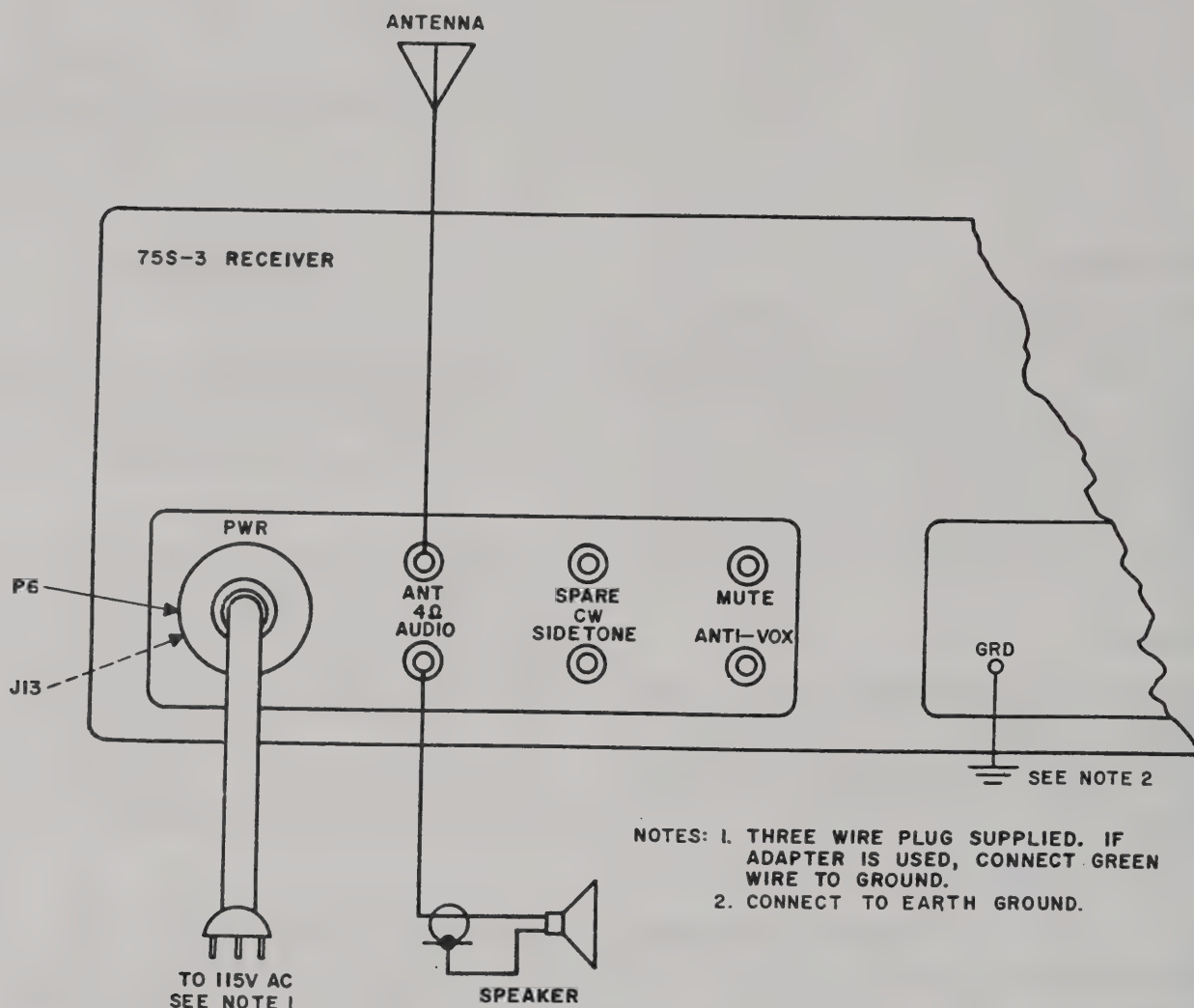
To connect the receiver for mute operation, a means of supplying a ground while receiving must be applied to the MUTE jack. Opening this circuit mutes the receiver. A set of normally closed contacts on a relay which is keyed with the transmitter may be used for this purpose. To use this circuit, the receiver must be operated in the STBY position.

The CW SIDETONE jack is a high-impedance, low-level audio input (0.2 volt rms, typical) to the receiver. Audio from a sidetone oscillator may be applied to this

TABLE 1-1. EQUIPMENT FURNISHED WITH 75S-3/3A

QUANTITY	DESCRIPTION	FUNCTION	PART NUMBER
2	Phono-type connectors	External connections	361-0062-00
1	Fuse, 2-ampere	Spare	264-4070-00
1	Power cord	A-c power	544-3121-00
1	Power plug adapter	A-c power	368-0138-00
1	Instruction book	75S-3/3A instructions	523-0148-00
1	Logbook	Station logging	523-0755-820
1	Cable marker card	Cable identification	280-2946-00
1	No. 4 Bristo wrench	Accessory tool	024-2900-00
1	No. 6 Bristo wrench	Accessory tool	024-9730-00
1	No. 8 Bristo wrench	Accessory tool	024-0019-00
1	No. 10 Bristo wrench	Accessory tool	024-9710-00

SECTION 1  
Installation



NOTES: 1. THREE WIRE PLUG SUPPLIED. IF ADAPTER IS USED, CONNECT GREEN WIRE TO GROUND.  
2. CONNECT TO EARTH GROUND.

Figure 1-1. External Connections

jack to provide a cw monitoring circuit through the receiver audio system.

The ANTI-VOX jack is a 500-ohm audio output from the receiver. At normal speaker volume levels, 5 to 10 volts rms is provided at this output. This voltage is normally applied to anti-vox circuits in an associated transmitter.

The PHONES jack on the front panel is connected through a resistive network to a 500-ohm tap on the output transformer. Therefore, best results will be obtained if headphones used are 500 ohms or higher impedance. The speaker is silenced when headphones are plugged in.

1.2.2 CABLING WITH 32S-3 TRANSMITTER. Figure 1-2 shows a complete station interconnection for a 75S-3 or 75S-3A Receiver, 32S-3 Transmitter, and

312B-4 Station Control. The RG-58C/U cables indicated are slightly larger in diameter and two inches shorter than the audio and control cables. If the 312B-4 is not used, connect a 4-ohm speaker, such as the 312B-3, to 4Ω AUDIO jack on receiver. Connect ANTI-VOX jack on receiver directly to ANTI-VOX jack on transmitter. Omit PHONE PATCH and PTT connections.

To connect the 75S-3 or 75S-3A and the 32S-3 for transceiver operation, use the patch cables furnished with the transmitter, and connect as follows:

- Connect the 32S-3 and 75S-3/3A as shown in figure 1-2.
- Remove P1 from XMTR XTAL OSC jack J7 (under 32S-3 top cover), and plug it into 32S-3 RCVR XTAL OSC jack J6. Remove the 100-ohm dummy load plug from the 75S XTAL OSC OUTPUT jack, and plug it into 32S-3 XMTR XTAL OSC jack J7.

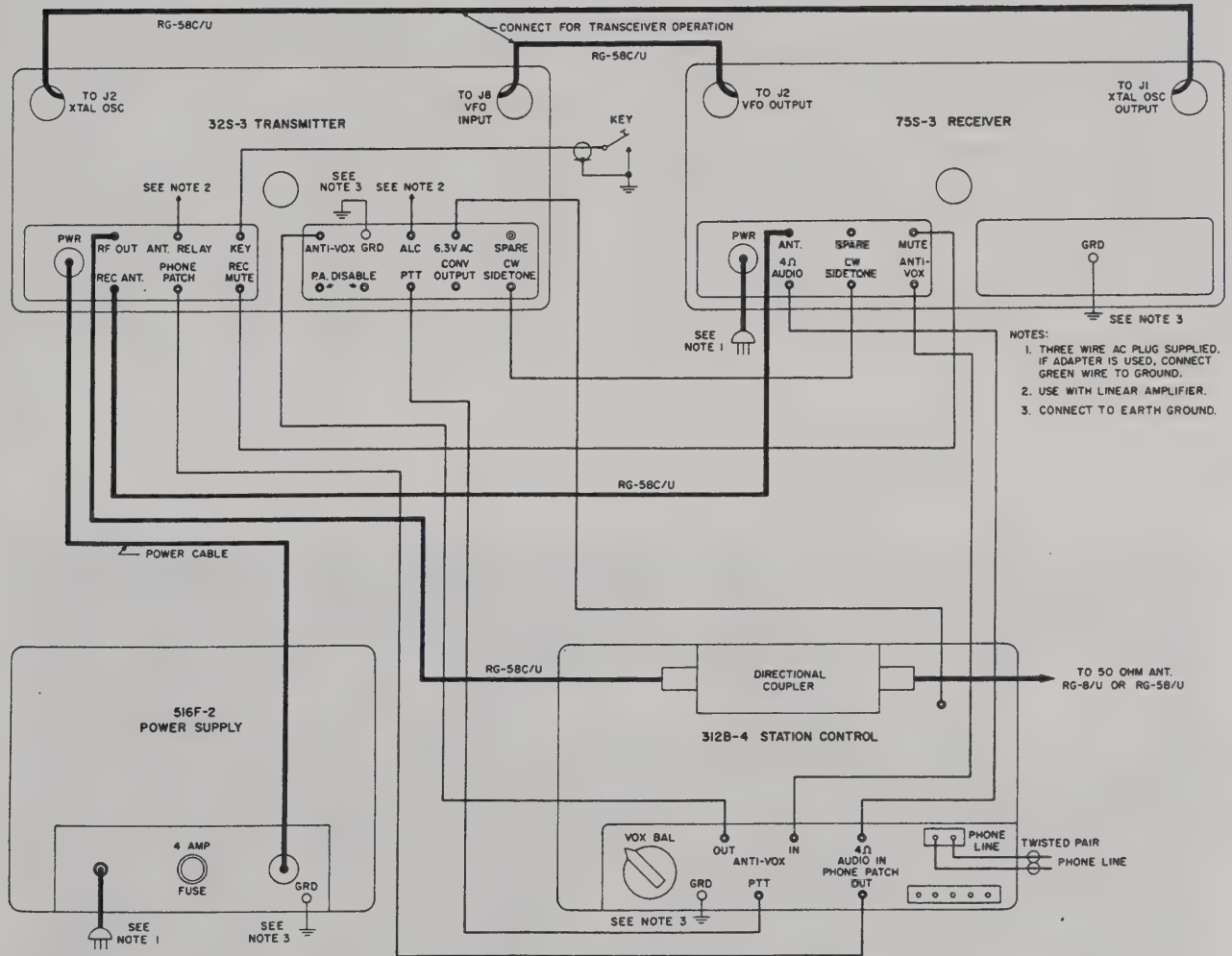


Figure 1-2. Station Interconnections



## SECTION 1

### Installation

**1.2.3 CABLING WITH KWM-2/2A TRANSCEIVER.**  
The 75S-3/3A may be used with a KWM-2/2A to provide separate transmit and receive frequencies. Connect the patch cables as follows:

- a. Using an RG-58C/U patch cable, connect REC ANT jack on KWM-2/2A to ANT jack on 75S-3/3A.
- b. Connect the 500  $\Omega$  jack on the KWM-2/2A to the ANTI-VOX jack on the 75S-3/3A. If a 312B-4 or 312B-5 is used, connect the KWM-2/2A 500 $\Omega$  jack to ANTI-VOX IN and the 75S-3/3A ANTI-VOX jack to ANTI-VOX OUT on the 312B-4/5.
- c. Connect the REC MUTE jack J20 on the KWM-2/2A to the MUTE jack on the 75S-3/3A.

The station speaker may be plugged into either the 4  $\Omega$  jack on the KWM-2/2A or the 4  $\Omega$  AUDIO jack on the 75S-3/3A. For normal mute operation, set the 75S-3/3A function switch to STBY. Receiver output from the KWM-2/2A is turned off by setting AF GAIN to zero. For transmit and receive operation on the same frequency, reduce the 75S-3/3A AF GAIN to zero, and operate the KWM-2/2A in a normal manner.

### 1.2.4 CABLING WITH OTHER TRANSMITTERS.

- a. To provide receiver muting when using 75S-3/3A with KWS-1, connect a cable from pins 5,6 on J102 (receiver disable) in the transmitter to MUTE jack on the receiver. Connect a cable from receiver ANTI-VOX jack to pin 7 on J102 (500-ohm audio) in the KWS-1. Connect cable shield to ground.
- b. To use the 75S-3/3A with the 32V-3, connect a cable from the receiver MUTE jack to receiver disabling pins 24 and 25 on the transmitter.
- c. To use the 75S-3/3A with other makes of transmitters, connect muting, cw sidetone, and anti-vox provisions in the receiver as applicable. The requirements for use are outlined in paragraph 1.2.1.

### 1.3 Initial Checks.

Lift the top cover, and make sure the dummy load (see figure 4-1) is plugged into the XTAL OSC OUTPUT jack unless the receiver is connected for transceiver operation. Recheck the interconnections to make sure the patch cables are plugged into the appropriate jacks. Be sure that RG-58C/U cables, rather than the audio and control cables, have been used for all r-f applications. Check to ensure the special Mu-Metal shields are in place on tube V11 and coil L10.

# section 2

## operation

### 2.1 Calibration.

- a. After making external connections, set controls as shown in figure 2-1.
- b. Set BAND switch (11) to desired frequency range. If receiver is 75S-3A, set crystal board selector (10) so desired set of bands appears in window.
- c. Set dial to 0, 100, or 200 with tuning knob (3).
- d. Adjust PRESELECTOR (2) for maximum signal or noise output.
- e. Tune back and forth near 0, 100, or 200 until calibrate signal is at zero beat.
- f. Adjust zero set knob (4) until dial is calibrated.

### 2.2 Single-Sideband Tuning.

- a. Set controls as shown in figure 2-1, except set function switch (1) to OPR, and the BFO knob fully counterclockwise until a click is heard.
- b. Set EMISSION switch (12) to desired sideband.
- c. Adjust PRESELECTOR (2) for maximum signal or noise output.
- d. Tune in signal and adjust AF GAIN (9) for desired audio output level.

When listening to strong signals, a reduction in background noise under no-modulation conditions may be

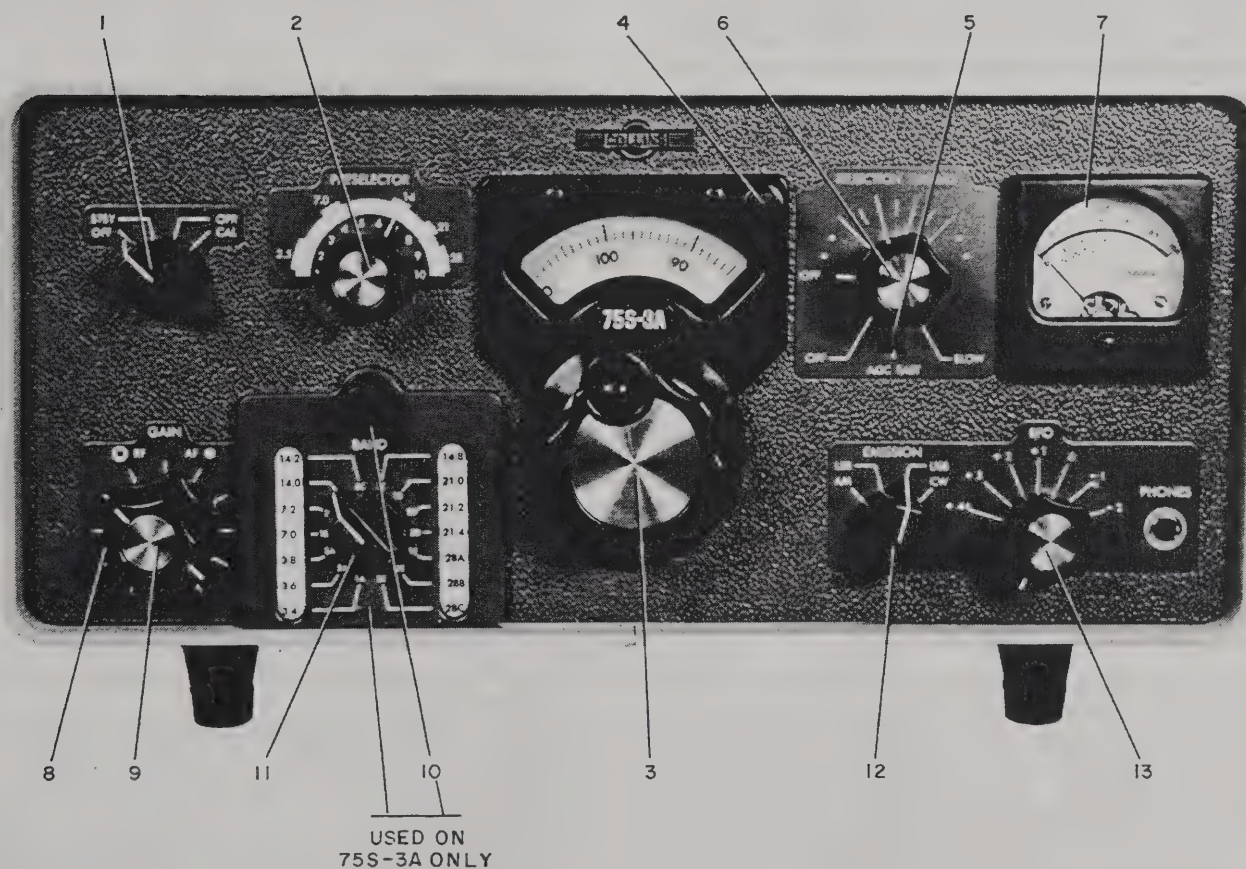


Figure 2-1. Operating Controls



## SECTION 2

### Operation

obtained by rotating RFGAIN control (8) counterclockwise, away from the maximum position. As this is done, S-meter (7) static reading will shift upscale. At proper gain control setting, meter will kick about one or two S-units on peaks. For example, if the weakest of the desired signals is peaking at S-9, set gain control so that static meter reading is S-7 to S-8. This retains accurate meter readings.

To read frequency, add the dial setting to the BAND switch setting. For example, if the BAND switch is set to 3.8 and the dial is set to 5, the frequency is 3.805 mc. If the BAND switch is set to 3.8 and the dial to 170, the frequency is 3.970 mc.

### 2.3 CW Tuning.

- Set controls as outlined in paragraph 2.2 except set EMISSION switch to CW.
- Rotate the BFO knob (13) clockwise to energize the tunable bfo. Set to either +1 or -1.
- Adjust BFO knob to yield the most pleasing beat note with the desired signal centered in the filter pass band.
- Read approximate frequency as follows: When BFO knob is set to the plus side of zero, add kilocycle reading from bfo scale to dial reading. Subtract bfo reading for minus settings of the knob. If a precision reading is desired, set the BFO knob, and recalibrate the main tuning dial using the crystal calibrator. When the main dial is calibrated in this manner, further adjustment of the BFO knob or switching to the crystal-controlled BFO requires recalibration of the dial.

Either fast or slow AGC (5) may be used, or it may be turned off. If AGC is turned off, decrease RF GAIN control setting to prevent receiver overloading. Adjust AF GAIN control to provide desired audio level. In general, it is best to set r-f gain at a point just below that which causes signal to overload receiver. This provides optimum sensitivity.

Tuning may be facilitated by switching first to USB to tune in the desired signal and then switching to CW to reduce interference. The beat note will be the same in either position. The wider pass band provided in USB is also useful for net operation.

### 2.4 AM Tuning.

- Set controls as outlined in paragraph 2.2.
- Set EMISSION switch to AM.
- Set AGC switch to FAST.
- Tune in signal, and adjust AF GAIN for desired audio output level.

If desired, SSB methods may be used for AM reception. Set EMISSION switch to either USB or LSB position; use tuning procedure for a single-sideband signal. Once the desired signal is tuned in, switching to the opposite sideband may yield a more readable signal. This method of reception is useful under conditions of severe interference or extreme fading.

### 2.5 RTTY Tuning.

This type of operation requires an external RTTY converter and printer. Tune receiver as follows:

- Set controls for SSB reception as outlined in paragraph 2.2 with EMISSION switch in USB position.
- Turn on tunable bfo by rotating BFO knob (13) clockwise.
- Set the pointer on the BFO tuning knob at the dot near -1 on the calibrated scale.
- Tune the receiver for maximum S-meter reading on the desired RTTY signal.
- Fine adjustment of the BFO tuning knob then will produce 2125 cps and 2975 cps mark and space signals at the receiver audio output. To reverse the mark and space signals, reset the BFO tuning knob to the dot near +4 on the calibrated scale.

### 2.6 Rejection Tuning.

An interfering heterodyne or cw signal may be reduced in level or eliminated by operation of the REJECTION TUNING knob (6). The off position for this control is at the end of extreme counterclockwise rotation. The on-off switch is provided with a positive stop rather than a detent. Do not force the knob. Clockwise rotation of the knob from the off position moves the rejection notch across the receiver pass band. It is recommended that the operator familiarize himself with the operation of this control by tuning the notch across the signal from the crystal calibrator.

When the receiver is initially placed in operation, it may be necessary to touch up the adjustment of R77. Refer to paragraph 4.5.8.

### 2.7 Use of S-Meter.

The S-meter is intended primarily to indicate relative rather than absolute signal strength. A nominal meter reading of S-9 is obtained with an input signal of 100 microvolts. The threshold of agc operation is set at the factory to a nominal value of 1.5 microvolts. Due to normal tolerances in receiver operation, agc threshold varies slightly from band to band causing correspondingly slight changes in the number of db represented by each S-unit. The db scale is calibrated with 1 microvolt as a reference; therefore, an S-9 signal of 100 microvolts represents a 40-db increase over the reference signal level. Since agc is not applied to very weak signals, S-zero is arbitrarily established at 10 db on the scale. Typical meter readings, therefore, can represent from 3.3 to slightly over 4 db per S-unit. A figure of 4 db can be taken as an average.

### 2.8 Transceiver Operation with 32S-3 Transmitter.

- Make sure patch cables are connected as outlined in paragraph 1.2.2.
- Set FREQ CONTROL (1) on 32S-3 to REC VFO position.
- Set OFF-STBY-OPR-CAL switch on 75S-3/3A to STBY position.
- Set both BAND selectors to the same desired band and both EMISSION switches to the same position (either USB, LSB or CW).
- Tune both receiver and transmitter as in normal operation. Both transmit and receive functions operate from the receiver vfo; the transmitter vfo is not used



in transceiver operation. Switching the transmitter FREQ CONTROL (1) back to TRANS VFO position will allow separate operation of the two units within the same 200-kc band.

## NOTE

In CW transceiver operation, the 75S variable bfo will have to be used to obtain the desired beat note if it is desired to transmit zero beat with another station.

**CAUTION**

When operating in transceiver service, do not operate the transmitter while the receiver is tuned outside band limits; the transmitted signal will be out of the band. Do not attempt operation with receiver and transmitter set on different 200-kc bands, even when operating in TRANS VFO position. With patch cables connected for transceiver operation, the receiver h-f crystal oscillator controls injection frequency to the transmitter second mixer.

If operation on different 200-kc bands is desired (that is, receive on one 200-kc band and transmit on another), remove the transceiver patch cables and operate the units as in normal independent operation.

If transmitted frequency is changed by any great amount, be sure to redip the PA plate current and check the loading. This will be most important on the 80- and 40-meter bands.

Some operating experience will indicate the amount of frequency excursion possible without readjustment.

Do not attempt operation in transceiver service with any other receiver not having the same frequency mixing scheme.

f. To restore both units to normal operation, remove the two patch cables connecting oscillator signals, replace P1 in J7 on the transmitter slug rack (under top cover), and replace the 100-ohm load plug in the receiver XTAL OSC OUTPUT jack.

**2.9 Operation Outside Amateur Bands.**

Additional 10-meter band coverage, or coverage outside the amateur bands may be obtained by plugging an appropriate crystal into the crystal mounting board. Two extra sockets are provided in the mounting board for this purpose. The total 3.4- to 30.0-megacycle coverage available is divided into five segments, designated A, B, C, D, and E. The frequency range of each of these segments is listed in the total coverage column of table 2-1. The letter portions of the crystal socket locations shown in figure 2-2 indicate which sockets may be used for crystals to cover a 200-kc band within a specific total coverage segment. For example, crystals for extended 10-meter coverage must be plugged into sockets marked E.

The proper crystal for coverage of a specific 200-kc band may be selected as follows:

a. If the lower edge of the desired band is 11.8 mc or less, the required crystal frequency is equal to the

TABLE 2-1. CRYSTAL FREQUENCIES AND OPERATING BANDS

BAND-SWITCH POSITION	FREQUENCY BAND	CRYSTAL SUPPLIED	CRYSTAL SOCKET CONNECTED	TOTAL COVERAGE
1A - 3.4	3.4 - 3.6 mc	6.555 mc	1A	A 3.4 - 5.0 mc
2A - 3.6	3.6 - 3.8 mc	6.755 mc	2A	
3A - 3.8	3.8 - 4.0 mc	6.955 mc	3A	
1B - 7.0	7.0 - 7.2 mc	10.155 mc	1B	B 6.5 - 9.5 mc
2B - 7.2	7.2 - 7.4 mc	10.355 mc	2B	
1C - 14.0	14.0 - 14.2 mc	8.5775 mc	1C	C 9.5 - 15.0 mc
2C - 14.2	14.2 - 14.4 mc	8.6775 mc	2C	
3C - 14.8	14.8 - 15.0 mc	8.9775 mc	3C	
1D - 21.0	21.0 - 21.2 mc	12.0775 mc	1D	D 15.0 - 22.0 mc
2D - 21.2	21.2 - 21.4 mc	12.1775 mc	2D	
3D - 21.4	21.4 - 21.6 mc	12.2775 mc	3D	
1E - 28A	28.5 - 28.7 mc	15.8275 mc	2E	E 22.0 - 30.0 mc
2E - 28B	As selected	Not supplied	2E	
3E - 28C	As selected	Not supplied	3E	



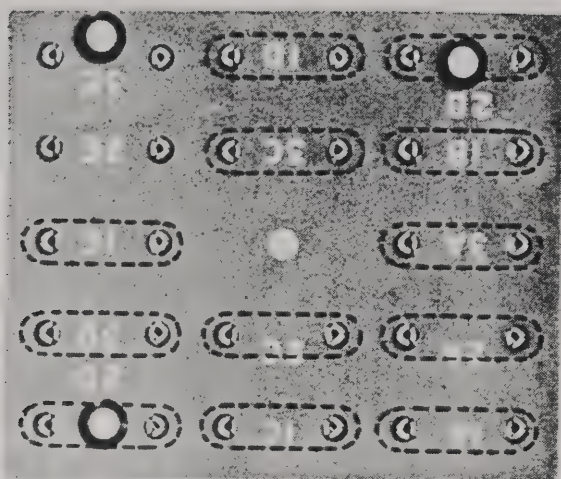


Figure 2-2. Crystal Socket Locations

lower edge of the desired band plus 3.155 mc. For example, if the desired band is 4.0 to 4.2 mc, the required crystal frequency is 7.155 mc.

b. If the lower edge of the desired band is 12.0 mc or higher, the required crystal frequency is equal to half the sum of the desired lower band edge and 3.155 mc. For example, if the desired band is 14.4 or 14.6 mc, the required crystal frequency is 8.7775 mc.

Extra crystals available are listed in section 6, Parts List.

Approximate settings for the PRESELECTION are shown in figure 2-3. For example, if coverage from 10.0 to 10.2 mc is desired, plug the appropriate crystal into a socket marked C, turn the BAND switch to that position, and set the PRESELECTION to approximately 3.2 on the logging scale. Peak the PRESELECTION tuning as in normal operation. The ANT, RF, and OSC trimmer capacitors (those marked C in the example above) may also be peaked if optimum performance is desired at frequencies outside the amateur bands. On some bands it is possible to peak the PRESELECTION tuning at an image frequency or at a different order of output frequency from the crystal oscillator; however, there is only one correct setting for coverage within a given 200-kc band.

The above information also applies to the 75S-3A except that two crystal mounting boards are provided in this receiver. The amateur-band board is located under the chassis. To obtain access, refer to paragraph 4.1. When crystal board selector (10) is switched to extended coverage position, the above-chassis board is switched into the circuit. The crystal socket locations are the same for both boards. Space is provided in the window adjacent to the BAND switch to mark in-band information. A pencil may be used to allow erasure if changes are made.

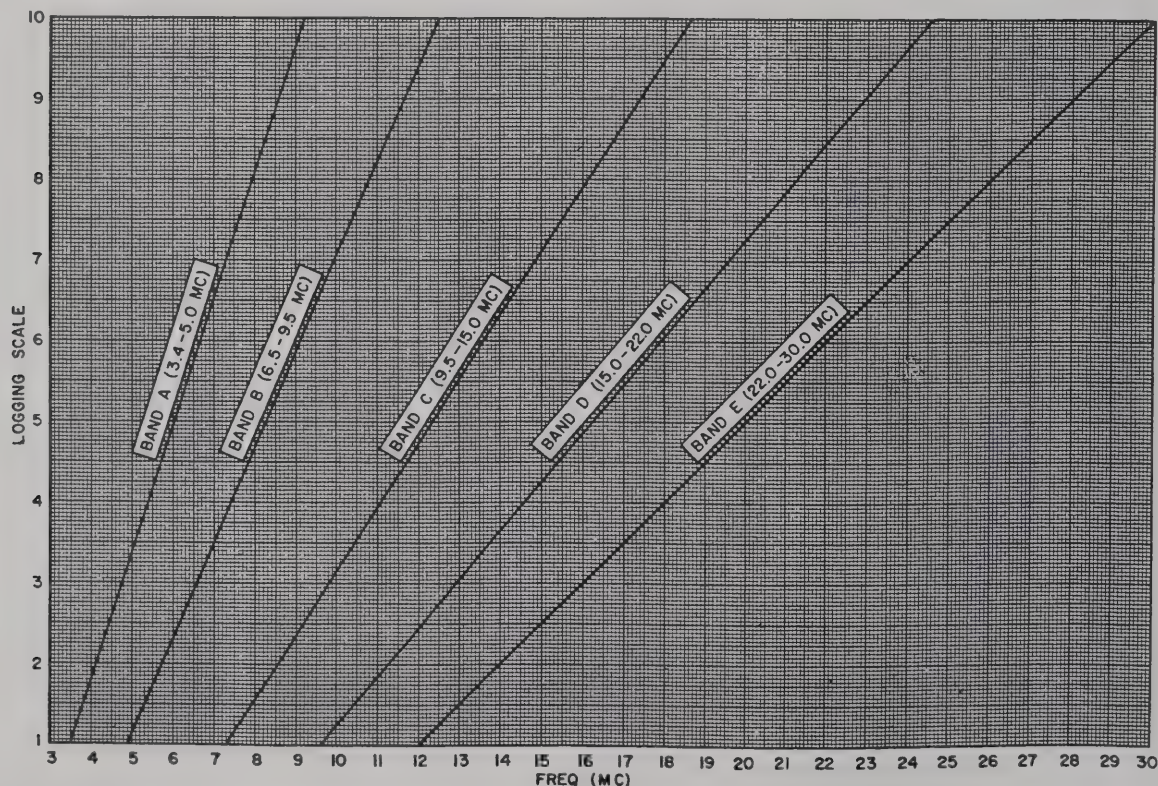


Figure 2-3. Preselector Calibration Curves



## principles of operation

### 3.1 Block Diagram.

Figure 3-1 is a block diagram for 75S-3 and 75S-3A Receivers. Double conversion is used, with injection voltage for the first conversion provided by a crystal-controlled oscillator. A band-pass i-f, 200 kilocycles wide, is used to couple the first and second mixers. Injection voltage for the second mixer is furnished by a vfo with a tuning range of 200 kc. The 455-kc output frequency of the second mixer is coupled through the i-f system to separate AM and SSB detectors. Injection voltage for the product detector is provided by either a crystal-controlled bfo or a tunable bfo. The 75S-3A is identical to the 75S-3 except that it is equipped with an extra h-f crystal mounting board on the chassis, a crystal board selector switch on the front panel, and associated components. Figure 7-1 is a schematic diagram for both receivers, with circuit differences noted.

### 3.2 R-F and Mixer Circuits.

The r-f amplifier grid, high-frequency mixer grid, and crystal oscillator plate circuits are resonated by slug-tuned coils. The slugs are mechanically ganged and linked to the PRESELECTOR tuning knob. The required tuning ranges of these circuits are obtained by switching appropriate values of fixed capacitance in parallel with the coils. The total 3.4- to 30-mc tuning range of the receiver is divided into five segments for band-switching purposes, as noted in table 2-1. The tuned circuit LC ratio is thereby varied within appropriate limits for each of the five segments.

Signals within the particular 200-kc band selected are amplified by V2, the r-f amplifier, and coupled to the control grid of V3A, the first mixer. Injection voltage is coupled to the cathode of V3A. Products of mixing are selected in the plate circuit of V3A, tuned to 3.155 to 2.955 mc which is the band-pass i-f frequency. Signals are coupled to the control grid of second mixer V4A with vfo injection voltage applied to the cathode of this tube.

### 3.3 Oscillator Circuits.

**3.3.1 CRYSTAL OSCILLATORS.** High-frequency crystal oscillator V3B provides injection voltage for the first mixer. The crystal oscillator output frequency is always 3.155 mc higher than the lower edge of the selected band. On bands below 12.0 mc, the oscillator plate circuit is tuned to the crystal frequency. At 12.0 mc and higher, the plate circuit is tuned to the second harmonic. The secondary winding of T2 couples injection voltage to the first mixer cathode circuit and furnishes a d-c return

to ground for mixer tube V3A. Dummy load R41 stimulates the load presented by the 32S-3 Transmitter when connected for transceiver operation.

Crystal-controlled bfo V8B and associated circuitry furnishes injection voltage for the product detector. Crystals Y15 and Y16 provide the proper bfo frequency relationships to the mechanical filter passband to yield optimum audio response from the product detector. Crystal Y15 is used for lower sideband reception, and Y16 is used for upper sideband. Capacitor C95 and coil L-12 form a broadly resonant circuit at 455 kc. Oscillator voltage is developed across R49 and coupled by C100 to the cathode of V8A, the product detector tube.

The crystal calibrator circuit provides marker signals at multiples of 100 kc. Variable capacitor C61 provides for adjustment to zero beat with WWV. The output of this oscillator is coupled to the receiver antenna circuits.

**3.3.2 VARIABLE OSCILLATORS.** The vfo uses fixed capacitance and variable inductance to produce the required tuning range of 2.5 to 2.7 mc. Capacitor C303, in the frequency-determining network, is paralleled by variable capacitor C308 in series with diode CR301. This diode switches C308 in or out of the circuit, depending upon the polarity of a bias voltage impressed across the diode junction. The bias voltage is coupled to the diode through R303, and is positive in the USB position causing CR301 to switch C308 into the circuit. When C308 is properly adjusted, it shifts the vfo frequency by an amount equal to the frequency separation of crystals Y15 and Y16. This allows either sideband to be selected without retuning or recalibrating the dial. The vfo output voltage is coupled to the cathode of second mixer tube V4A and to the control grid of cathode follower V4B. The cathode follower prevents loading of the vfo circuits by cable capacity when operated in transceiver service.

Tube V11 and associated circuitry comprise a tunable bfo. The bfo tuning control is potentiometer R81. This control varies a positive d-c voltage applied to the junction of voltage-variable capacitor CR4. The junction capacity of this device is proportional to applied voltage. Adjustment of R81 therefore varies the output frequency of the bfo. Voltage for the tuning circuit is stabilized by a regulator consisting of Zener diode CR5 and resistor R82. Switch S13 completes the cathode circuit of either V8B or V11 thus turning on the desired bfo



## SECTION 3

### Principles of Operation

and turning off the other. The output circuits of both oscillators are coupled to the product detector.

#### 3.4 I-F And Detector Circuits.

Output from the second mixer is coupled to either one of two band-pass filters or 455-kc tuned circuits. A mechanical filter with 2.1-kc nominal bandwidth is provided for SSB reception. A band-pass crystal filter with 250 cps nominal bandwidth is selected in the CW position. For AM reception, two cascaded 455-kc transformers provide increased bandwidth. Output from these circuits is coupled through the Q-multiplier to the first i-f amplifier, V6. The cathode of V6 is returned to ground through potentiometer R57 which is used to set the gain of this stage at a point producing the proper agc threshold. The S-meter circuit is connected from the screen circuits of V6 and V7, the two i-f amplifiers, to the cathode of V7. Under no-signal conditions, the voltage developed across R13 is equal to that developed across R17, and the meter reads zero. Application of agc causes the cathode current of V7 and the combined screen current of V6 and V7 to decrease. The voltage across R17 increases, the voltage across R13 decreases, and the meter reads up-scale by an amount which is proportional to signal strength. Output voltage from the second i-f amplifier is coupled to the product detector, V8A. It is also coupled to separate AM and agc diode detectors. Injection voltage is applied to the cathode of the product detector.

#### 3.5 Q-Multiplier And Notch Filter.

The notch filter is composed of coil L8 and associated capacitors and resistors. The rejection notch occurs at the resonant frequency of this circuit and is centered at 455 kc. Capacitor C132 is mechanically coupled to the REJECTION TUNING control which allows the notch frequency to be moved across the receiver i-f passband. Potentiometer R77 is adjusted to provide optimum Q and depth of notch. Switch S10 shorts the filter circuit in the OFF position. The Q-multiplier is a feedback circuit which includes L8. This circuit multiplies the Q of L8 approximately ten times, thereby obtaining a much deeper and narrower rejection notch than would be provided by the filter alone. The notch shape provided by this circuit allows unwanted signals to be rejected with minimum disturbance to desired signals.

#### 3.6 AGC And Control Circuits.

Signal voltage is coupled from the secondary of transformer T6 to one of the diode plates in V9 and rectified. Agc voltage is developed across R24, the diode load resistor, and is applied to the r-f and i-f amplifier stages. Signal voltage is filtered from the agc line by R50 and C49. Generation of agc voltage is delayed until the signal voltage at the diode plate exceeds the cathode bias on V9. Potentiometer R57 in the cathode

of the first i-f amplifier tube is normally adjusted so that agc action is initiated with a receiver input signal of approximately 1.5 microvolts. This point is referred to as agc threshold. Agc time constant is determined by the amount of capacitance placed in parallel with R24. Added capacity in the SLOW position of the AGC selector produces a slower release characteristic.

Manual control of r-f gain is also accomplished through the agc line. A voltage divider circuit, consisting of resistors R33, R55, and RF GAIN control R56, is connected across the negative 65-volt bias line. At the maximum gain setting, this circuit places a one-volt static bias on the agc line to furnish proper operating bias for r-f amplifier V2. At lower control settings, increased bias is provided which reduces the gain. The d-c grid return for the first mixer stage and MUTE jack J11 are connected to the junction of resistors R33 and R58. When the receiver function switch is placed in the STBY position, a ground at J11 causes the receiver to operate in a normal manner. Removal of this ground causes cutoff bias to be applied to the mixer grid and increased bias on the agc line, thus muting the receiver.

#### 3.7 Audio Circuits.

Audio voltage from the appropriate detector is selected by S8A on the EMISSION switch, and is coupled to the AF GAIN control. The CW SIDETONE jack, J10, is also connected to this point. A sidetone audio voltage of approximately 0.2 volt will produce a normal listening level at average gain settings. Audio is amplified in a two-stage amplifier consisting of tubes V8 and V10. Three audio outputs are provided. Jack J8 is a 4-ohm outlet for a speaker. The headphone jack is connected to a resistive divider across the 500-ohm tap on the output transformer. The divider provides a load for V10 when the impedance of headphones used is relatively high. The ANTI-VOX jack, J12, is also connected to the 500-ohm tap. At normal audio gain settings, 5 to 15 volts of audio are available at J12 for use with the anti-vox circuits in an associated transmitter.

#### 3.8 Power Supply Circuits.

The internal power supply furnishes filament, plate, and bias voltages for the receiver. Bias voltage is obtained by rectifying a portion of the a-c voltage appearing from one leg of the high-voltage secondary to ground. The tube filaments and pilot lamps are connected in a way which allows operation from a 6-, 12-, or 24-volt source. Filament, plate, and bias voltages may be furnished by an external source such as a mobile power supply. Figure 7-1 illustrates the proper connections to the power plug for this type of operation.

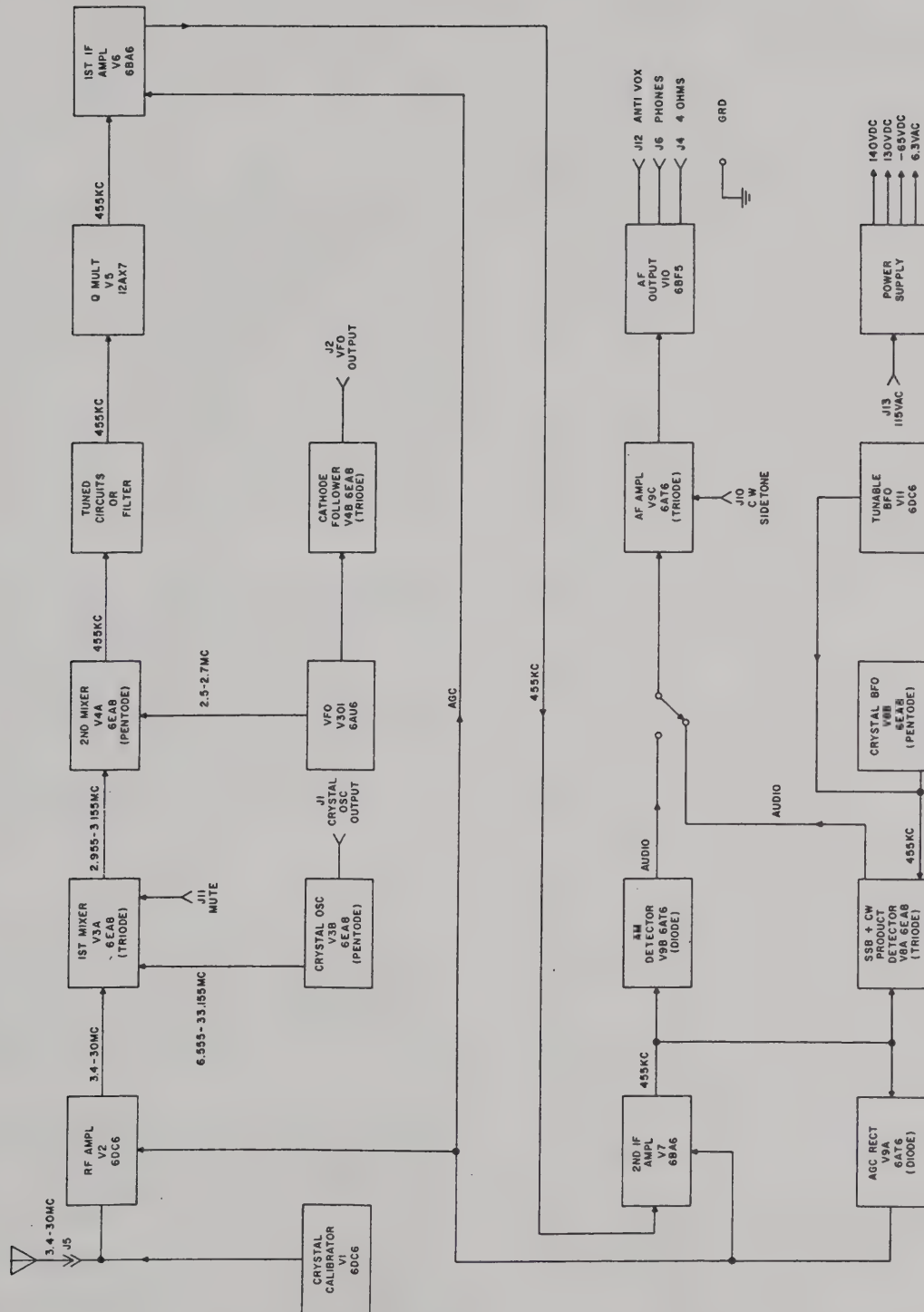


Figure 3-1. Block Diagram





## service instructions

### 4.1 General.

This section covers maintenance and service of 75S-3 and 75S-3A Receivers. It includes information on trouble analysis, signal tracing procedures, voltage and resistance measurements, and alignment procedures. The usefulness of signal level and alignment data given depends upon the accuracy of the test equipment used. Minor adjustments in alignment may be made using the crystal calibrator as a signal source. Except for an occasional touch-up to compensate for possible component aging, alignment normally will be necessary only if frequency-determining components have been replaced. If servicing requires that the cabinet be removed, proceed as follows:

- a. Disconnect all power and external connections.
- b. Lift the lid, and remove the two screws located at the front edge of the cabinet.
- c. Remove the four feet and the screw located midway between the rear feet.
- d. From the rear, push the receiver chassis forward until the front panel protrudes from the cabinet about an inch.
- e. Grasping the front panel at the edges, slide the receiver out of the cabinet.

#### NOTE

DO NOT lubricate the 70K-2 vfo shaft bearings or the dial drive system bearings. The vfo shaft bearings are lubricated at the factory with a special grease. Dial bearings are the Oilite type which are self-lubricating.

Tube filaments and pilot lamps are connected in series-parallel arrangements for 12- or 24-volt operation. When making tube or lamp replacements, be sure that rated filament currents are the same as the original units.

### 4.2 Trouble Analysis.

Most cases of trouble can be traced to defective tubes. Many tube checkers can not duplicate the conditions under which the tubes work in the receiver. Substitution of new tubes will sometimes clear an obscure case of tube trouble. Intermittent trouble conditions in tubes can usually be discovered by lightly tapping the envelope. Occasionally, tube pins or socket terminals will become dirty or

corroded causing an intermittent condition. When this situation is suspected, remove the tube and apply a few drops of contact cleaner to the tube pins. Replace the tube, and work it up and down in the socket a few times. Shorted tubes or capacitors will often cause associated resistors to overheat and crack, blister, or discolor. Making the measurements listed in table 4-1 will help to isolate this type of trouble to a particular stage or component.

A logical process of elimination in conjunction with a study of the main schematic diagram, block diagram, and section 3 will aid in isolating trouble. For example, if the receiver functions properly in the AM position but fails to operate in the SSB or CW positions, trouble in the product detector should be suspected because this circuit is not used for AM reception. As a further check, both beat-frequency oscillators should be alternately switched into the circuit to see if one has failed. A third possibility would be that both beat oscillators have failed.

If the receiver is to be returned to the factory or an authorized service agency, a detailed report of operational difficulties will assist the servicing agency in making repairs with a minimum of time and expense. This is particularly important when intermittent trouble is involved.

### 4.3 Voltage And Resistance Measurements.

Table 4-1 lists typical voltage and resistance readings at each tube socket terminal except those of the vfo tube, V301. Do not open the vfo can. Make all measurements under the following conditions:

- a. Unless otherwise noted in the table, set RF GAIN at maximum, AF GAIN at minimum, EMISSION switch in USB position, function switch in OPR position, tunable bfo off, REJECTION TUNING OFF, and AGC in the FAST position.
- b. Voltage measurements are made with power connected.
- c. Resistance measurements are made with all external cables, including power cable, disconnected. Resistances of less than one ohm are listed as zero.
- d. Make all measurements from indicated socket terminal to chassis ground.

It is recommended that a vtvm be used for these measurements. A vom may be used if it has an input resistance of not less than 20,000 ohms per volt. Voltage measurements made with a vom will yield lower readings in high impedance circuits such as the agc line. Do not use a vom for r-f measurements.

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Service Instructions

TABLE 4-1. VOLTAGE AND RESISTANCE MEASUREMENTS

TUBE	TUBE SOCKET TERMINAL								
	1	2	3	4	5	6	7	8	9
V1 CAL ON DCV CAL OFF DCV ACV OHMS	-52 0 1 MEG	+0.7 52 1000*	0 0	6.3 0	105 142 230K**	51 142 220K**	0 0 0		
V2 DCV ACV OHMS	-0.8 6 MEG	0 0	0 0	6.3 0	138 18K** ①	72 60K**	0 0		
V3 DCV ACV OHMS	112 18K** ①	-11 100K	130 17K** ①	0 0	6.3 0	130 17K** ①	0 0	3.6 1000	0 230K
V4 DCV ACV OHMS	120 18K** ①	0 82	120 18K** ①	6.3 0	0 0	120 19K** ①	4.4 1000	5.4 680	2.7 100K
V5 DCV ACV OHMS	138 18K** ①	-0 100K	1.1 680	0 0	0 0	143 18K** ①	0 340K	1.1 680	6.3 0
V6 DCV ACV OHMS	-0.8 3.7 MEG	0 0	0 0	6.3 0	138 0	74 19K** ①	2.2 22K ①		
V7 DCV ACV OHMS	-0.8 3.6 MEG	0 0	0 0	6.3 0	138 19K** ①	72 23K** ①	0.62 85		
V8 DCV ACV OHMS	46 120K**	-3.2 1 MEG	48 240K**	6.3 0	0 0	112 20K** ①	0 0 ②	0 5	-2.7 5600
V9 DCV ACV OHMS	1.1 680K	2.7 12K	6.3 0	0 0	-0.9 3.5 MEG	0 CW, SB 23 AM ∞ CW, SB 220K AM	100 120K**		
V10 DCV ACV OHMS	-11 250K	0 0	6.3 0	0 0	127 18K** ①	122 18K** ①	-11 250K		
V11 ON DCV OFF DCV ACV OHMS	-2 0 47K	0 25 0 ③	6.3 0	0 0	128 128 20K** ①	30 128 38K**	0 0 0		

\*FUNCTION switch in CAL position

\*\*Resistance may vary depending upon diode and electrolytic condition

① Reverse VOM leads and take highest of the two readings

② Tunable BFO switch OFF

③ Tunable BFO switch ON

TABLE 4-2. SIGNAL LEVELS

SIGNAL INJECTION POINT	GENERATOR OUTPUT FREQUENCY	GENERATOR OUTPUT VOLTAGE	NORMAL INDICATION
V10 - pin 1	1000 cps	5.4 volts	1-watt audio output
V9 - pin 1	1000 cps	0.2 volt	1-watt audio output
V8 - pin 9	455 kc	75 millivolts	1-watt audio output
V8 - pin 6	BFO INJECTION		1.65 volts r-f (each bfo)
V7 - pin 1	455 kc	48 millivolts	Agc threshold
V6 - pin 1	455 kc	175 microvolts	Agc threshold
V4 - pin 6	455 kc	1400 microvolts	Agc threshold
V4 - pin 7	VFO INJECTION		2.0-2.5 r-f volts
V4 - pin 2	3.055 mc	100 microvolts	Agc threshold
V3 - pin 8	HF OSC INJECTION		0.8-2.0 r-f volts
V3 - pin 9	14.1 mc	30 microvolts	Agc threshold
V2 - pin 1	14.1 mc	9 microvolts	Agc threshold
J5 (ANT)	14.1 mc	1.5 microvolts	Agc threshold

#### 4.4 Signal Tracing.

Appropriate test points and normal signal levels are listed in table 4-2. The values listed are nominal. Signal levels in a given receiver may differ from those listed by a factor of plus or minus 20 percent without noticeable degradation in performance. A signal generator with an accurately calibrated output attenuator must be used to provide the r-f signal source voltages indicated. A Hewlett-Packard model 606A or equivalent generator is recommended for this purpose. Be sure to consult the signal generator instruction book for information regarding output termination requirements. Measurements of oscillator injection voltages require the use of an r-f vtmv such as the Hewlett-Packard model 410B. Make r-f and audio measurements under the following conditions:

a. For audio measurements, use an audio oscillator as the signal source and an a-c vtmv or calibrated oscilloscope to monitor receiver audio output. If desired, an audio wattmeter may be used. Set AF GAIN at maximum, and terminate the 4 $\Omega$  AUDIO output with a four-ohm resistive load.

b. Oscillator injection voltages are measured with an r-f vtmv. Measure from cathode to chassis ground at the associated mixer or product detector tube.

c. To check r-f signal levels, connect a d-c vtmv to the receiver agc line. Set RF GAIN at maximum. Static d-c voltage on the agc line should be approximately -1.0 volt. Connect the r-f signal generator to the point indicated in the table, and rock the generator dial to produce maximum agc voltage. Starting from minimum output, increase signal generator output to the point where a further increase in signal produces a slight increase in agc voltage. This is agc threshold. Note generator output voltage, and compare with the value listed in the table.

#### 4.5 Alignment Procedure.

Complete alignment of the receiver may be accomplished using the crystal calibrator as a signal source and the S-meter as a peak indicator. To provide a variable output attenuator for the calibrator, connect a .001-uf capacitor to one end of a 5000-ohm carbon potentiometer. Temporarily connect the free end of the capacitor to tube socket terminal 5 of V1, the crystal calibrator. Connect the rotating contact of the potentiometer to ground. Figure 4-1 shows the location of adjustments except for the filter input and output trimmer capacitors. These trimmers are located under the chassis adjacent to the mechanical and crystal filters. The



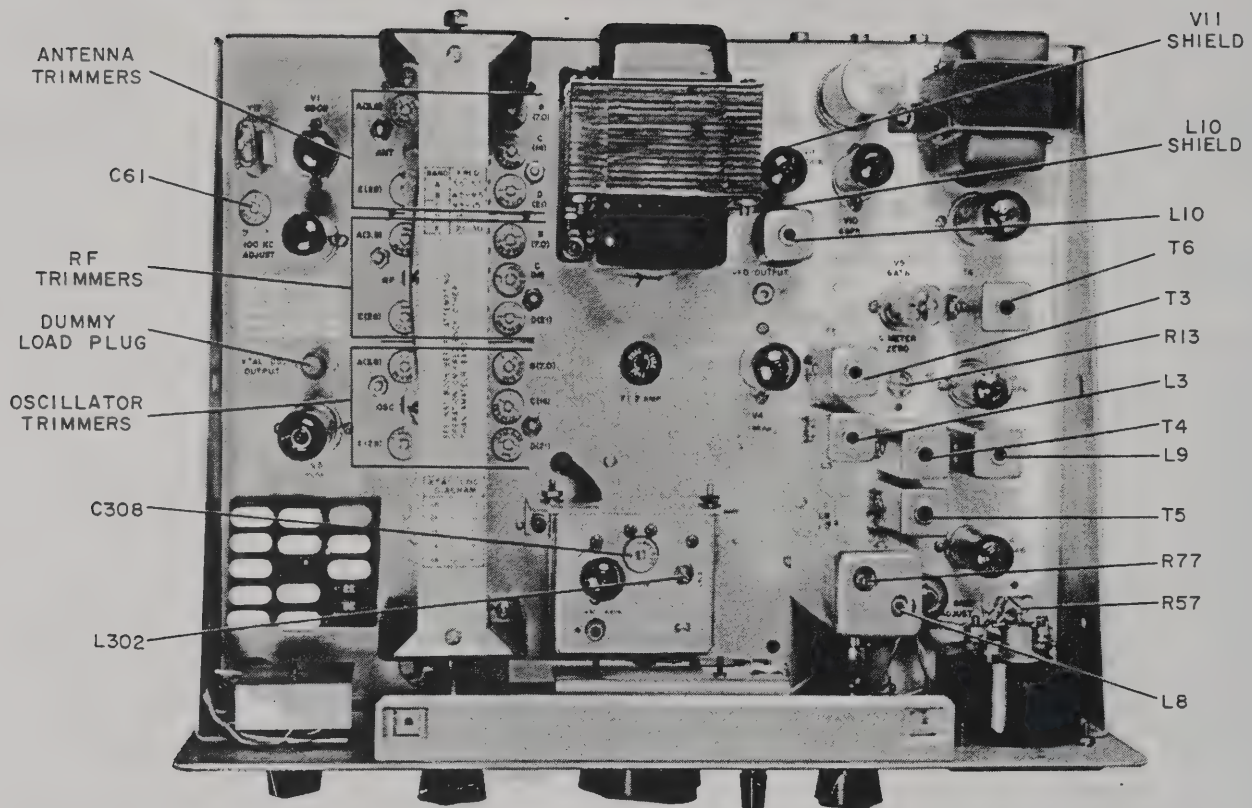


Figure 4-1. Location of Adjustments

rotary ceramic trimmers used in the receiver are at maximum capacity when the large notch is positioned midway between the two mounting screws. Rotation in either direction from this position reduces capacity with minimum being at 180 degrees from maximum.

#### 4.5.1 455-KILOCYCLE I-F ALIGNMENT.

- a. Set EMISSION switch to USB, and tune to the calibrate signal at 3.7 mc.
- b. Adjust calibrator output attenuator to provide S-meter reading of approximately S-3.
- c. Adjust the slugs of L9 and T6 for peak meter reading. Reduce calibrator output as necessary to maintain a low meter reading. Repeat L9 and T6 adjustments.
- d. Adjust C122 and C123, SSB filter input and output trimmers, for peak meter reading.
- e. Switch to CW position, and adjust C126 and C127, CW filter input and output trimmers, for

peak meter reading. Rock receiver tuning dial to make sure signal is centered in filter passband.

f. Switch to AM position, and adjust top and bottom slugs of T4 and T5 for peak meter reading. This completes alignment.

g. If a signal generator is used for this alignment, remove vfo tube V301, connect generator to pin 2 of V4, and adjust frequency to center of filter pass band. Align as outlined above, disconnect generator, and replace V301.

#### 4.5.2 BAND-PASS I-F ALIGNMENT.

- a. Set EMISSION switch to CW, and tune to the calibrate signal at 3.7 mc.
- b. Make two swamping networks by connecting a .01-uf capacitor in series with a 1000-ohm resistor and connecting alligator clips to the two remaining leads.

c. Connect one swamping network from T3 primary (terminal 1) to ground and the other from L3 (terminal 1) to ground.

d. Adjust attenuator to provide meter reading of approximately S-3.

e. Peak the secondary of T3 (top of can) using a Walsco 2543 or equivalent type tuning tool.

f. Remove both swamping networks and swamp T3 secondary (terminal 3 to ground). Peak T3 primary (bottom of can), and peak L3.

g. Remove swamping network from T3 secondary. This completes band-pass i-f alignment.

h. If a signal generator is used for this alignment, disable the h-f crystal oscillator by removing the crystal for the 3.6-mc band. Connect the signal generator to the XTAL OSC OUTPUT jack, and set to 3.055 mc. Tune receiver to the generator signal at approximately 100 on the dial. Align as above, disconnect generator, and replace crystal.

#### 4.5.3 R-F CIRCUIT ALIGNMENT.

a. Tune to the calibrate signal at 3.7 mc with the EMISSION switch in either USB or LSB position. Connect a 47-ohm resistor or a dummy load such as the DL-1 to the 75S-3/3A ANT jack. During the following procedures, adjust the calibrator output attenuator as necessary to maintain a meter reading of approximately S-3.

b. Set both A (3.8) RF and ANT trimmer capacitors so the large notches point to approximately 2 o'clock when viewed as shown in figure 4-1. Set the A (3.8) OSC trimmer so the large notch points to the rear of the chassis.

c. Set the PRESELECTOR to 2.1 on the logging scale.

d. Adjust the OSC, RF, and ANT slugs located on the movable platform the maximum S-meter indication. Adjust the OSC slug first. After making these adjustments, make sure the PRESELECTOR tuning peaks at 2.1 on the logging scale.

e. Set BAND switch to 28A, PRESELECTOR to 8.9 on the logging scale, and tune to the calibrate signal at 28.6 mc. Maintain S-3 signal level.

f. Adjust E (28) OSC, RF, and ANT trimmer capacitors for peak S-meter reading. Adjust OSC trimmer first.

g. Set BAND switch to 21.0 and PRESELECTOR to 7.9 on the logging scale. Tune to calibrate signal at 21.1 mc. Maintain S-3 signal level.

h. Adjust D (21) OSC, RF, and ANT trimmers for peak S-meter reading. Adjust OSC trimmers first.

i. Set BAND switch to 14.8 and PRESELECTOR to 7.0 on the logging scale. Tune to calibrate signal at 14.9 mc. Maintain S-3 signal level.

j. Adjust C (14) OSC trimmer for peak S-meter reading.

k. Set BAND switch to 14.2 and PRESELECTOR to 6.6 on the logging scale.

l. Adjust C (14) RF and ANT trimmers for peak meter reading. Maintain S-3 signal level.

m. Set BAND switch to 7.0 and PRESELECTOR to 3.9 on the logging scale. Tune to calibrate signal at 7.1 mc. Maintain S-3 signal level.

n. Adjust B OSC, RF, and ANT trimmers for peak S-meter reading. Adjust OSC trimmer first.

o. Disconnect the crystal calibrator output attenuator. This completes r-f alignment.

p. If signal generator and r-f vtvm are used for this alignment, connect the generator output to the receiver ANT jack. Set generator output to frequencies listed, and align RF and ANT trimmers as outlined in preceding steps. Connect r-f vtvm to XTAL OSC OUTPUT jack on bottom side of chassis, leaving load plug P1 in place. Align OSC trimmers as indicated except adjust for peak reading on the vtvm. In step k, adjust PRESELECTOR near 6.6 on logging scale at the point where vtvm reading peaks.

#### 4.5.4 VFO SIDEBAND FREQUENCY SHIFT ADJUSTMENT.

Set EMISSION switch to LSB, and tune to zero beat with calibrate signal at 3.7 mc. Without further movement of the dial, switch to USB, and adjust C308 (on vfo) for zero beat.

#### 4.5.5 CRYSTAL CALIBRATOR ADJUSTMENT.

a. Set receiver for AM reception, and tune to WWV at 15.0-mc at a time when the station is not transmitting tone.

b. Turn function switch to CAL position. Set 100 KC ADJUST trimmer C61 for zero beat of the calibrate signal against WWV.

#### 4.5.6 VFO DIAL CALIBRATION.

Calibrate the dial at 100. If zero beat with the calibrate signal does not occur at 0 and 200 +1 kc on the dial, there is end-point spread. If there is no end-point spread, but the hairline is not vertical when the dial is calibrated, a mechanical adjustment only is required. Refer to step h in the following procedure. To correct for end-point spread, make the following adjustments:

a. Set BAND switch to any band and function switch to CAL, and tune calibrate signal to zero beat at 200 end of the dial.

b. Set hairline to 200 with zero set knob.

c. Tune calibrate signal to zero beat at 0 end of the dial. Note the difference in kilocycles between the hairline and dial 0 (example: -1.5 kc).

d. Without moving the hairline, move the dial to the opposite side of 0 by an amount equal to the frequency difference noted above (example: +1.5 kc).

e. Adjust L302 for zero beat. It is located on top of the vfo can.

f. Set the hairline at 0 with zero set knob.

g. Tune the calibrate signal to zero beat at the 200-end of the dial. If zero beat does not occur at exactly 200, repeat steps b through e.



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h. After adjustment of end points, if the hairline is not vertical in the dial window, loosen the set-screws on the dial hub, and move the dial relative to the oscillator shaft so that, at zero beat, the dials reads 0 to 200 with the hairline vertical.

i. After these adjustments of the vfo calibration, make the vfo sideband frequency shift adjustment as outlined in paragraph 4.5.4.

#### 4.5.7 TUNABLE BFO ALIGNMENT.

a. Make sure the BFO tuning knob is correctly positioned on the shaft. At the control end stops, the knob pointer should be at approximately 7 o'clock (ccw end) and 5 o'clock (cw end).

b. Rotate BFO knob to extreme counterclockwise.

c. Turn on calibrator and tune receiver to zero beat in USB position.

d. Turn on tunable bfo, and set BFO knob to 0.

e. Adjust L10 for zero beat.

#### 4.5.8 NOTCH FILTER ALIGNMENT.

a. Check REJECTION TUNING knob position. Pointer should be at OFF when the knob is at the counterclockwise stop. Leave at OFF position.

b. Tune to the calibrate signal on a band which provides a calibrate signal level of approximately S-9 plus

20 db in either USB or LSB position. Center signal in filter passband (approximately 1350-cps tone).

c. Set REJECTION TUNING knob to midscale (pointer vertical).

d. Alternately adjust L8 and R77 for maximum depth of notch as indicated by minimum S-meter reading. If the Q-multiplier exhibits a tendency to ring or oscillate, back off slightly on R77.

#### 4.5.9 I-F GAIN ADJUSTMENT.

To set i-f gain control R57, a signal generator with a calibrated output attenuator is required. Connect the signal generator to the receiver ANT jack, and adjust to 1.5 microvolts output at 28.6 mc. Tune the receiver to the generator signal, and adjust R57 to the point which produces a just-perceptible increase above the no-signal reading on the S-meter. Do not make this adjustment until receiver alignment has been completed.

#### 4.5.10 S-METER ZERO ADJUSTMENT.

a. Set receiver to the middle of any operating band, and peak PRESELECTOR for maximum output.

b. Set RF GAIN to maximum, and short ANT jack to ground.

c. Set S-METER ADJUST (R13) so S-meter reads zero.

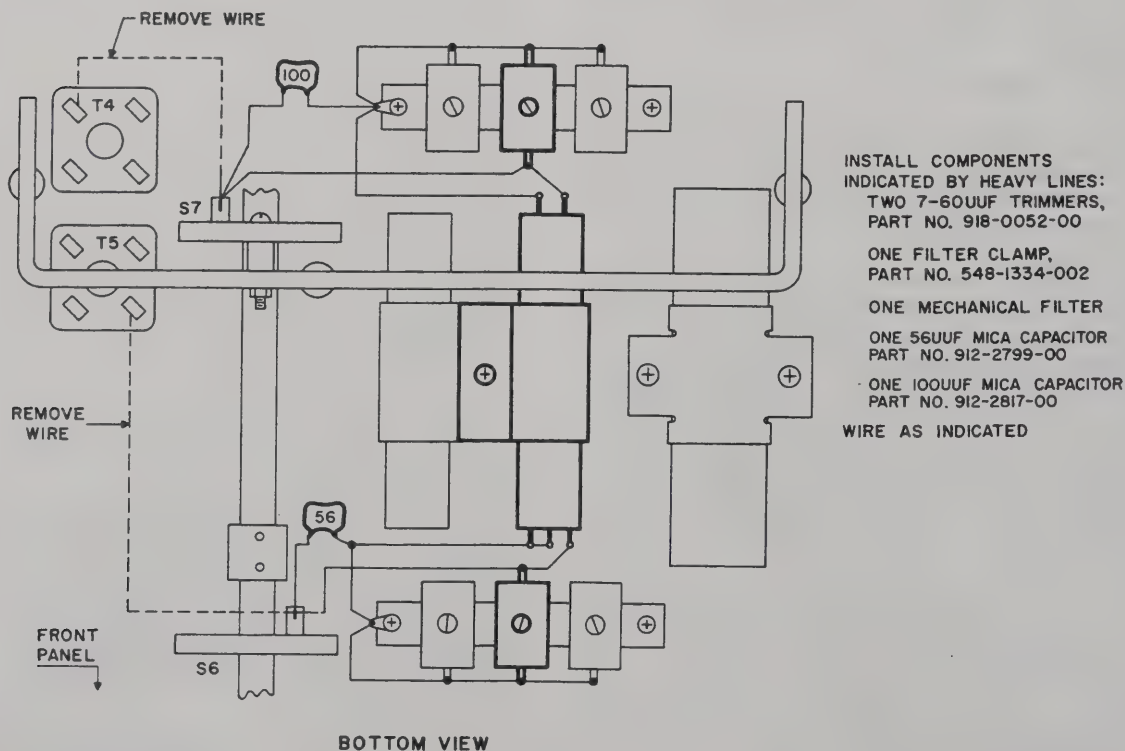


Figure 4-2. Optional Filter Installation Diagram



#### 4.6 Installation of Optional Filters.

Space is provided in the 75S-3/3A to install accessory filters in place of the 455-kc transformers used in the AM function. Figure 4-2 shows the placement of parts and required wiring changes.

To obtain access to the front trimmer-mounting strip, remove the long strip located behind the front panel and fastened by machine screws to the brackets for the front cabinet feet. Bend the mounting tabs on the new trimmer capacitors slightly toward each other, snap the trimmers into place on the trimmer-mounting strips, and solder the appropriate lugs to the ground buses as shown in figure 4-2. Install the filter as shown. If necessary, bend the new filter

clamp slightly to provide a good fit around the filter. One end of the filter has three terminals, one of which has no insulation around it. This is the case ground. Connect this terminal and either one of the two remaining terminals to chassis ground. Either of the terminals on the opposite end of the filter may be used for the ground connection indicated. Dress the new wiring carefully to prevent shorts. Where needed, use spaghetti from removed wiring.

When installation and wiring are completed, turn the receiver on, and tune to the calibrate signal at 14.0 mc. Adjust the filter trimmer capacitors for maximum S-meter reading with the signal centered in the filter passband. Available filters and installation kit of parts are listed in table 5-2.



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**1.1 Unpacking.**

Lift the receiver out of the carton and packing material. Examine for visible damage. If the receiver has been damaged in shipment, save the box and packing material, and notify the transportation company. Complete and mail the equipment registration card. Check tubes and crystals for proper seating in sockets. Check tuning controls and switches for freedom of action. Check that the special Mu-Metal shields are in place on tube V11 and coil L10 (see figure 4-1). Check the equipment included with the receiver against table 1-1.

**1.2 Cabling.**

**1.2.1 EXTERNAL CONNECTIONS.** Figure 1-1 shows the location of jacks for external connections to 75S-3 and 75S-3A receivers. The power cable plugs into socket J13. The ANT jack is a nominal 50-ohm antenna input. The 4  $\Omega$  AUDIO jack is for connection of a speaker.

**CAUTION**

DO NOT connect the a-c power cord to the 115-volt a-c line until power plug P6 has been plugged into J13. To avoid damage to the receiver, make sure the key on P6 is properly aligned with the keyway on J13.

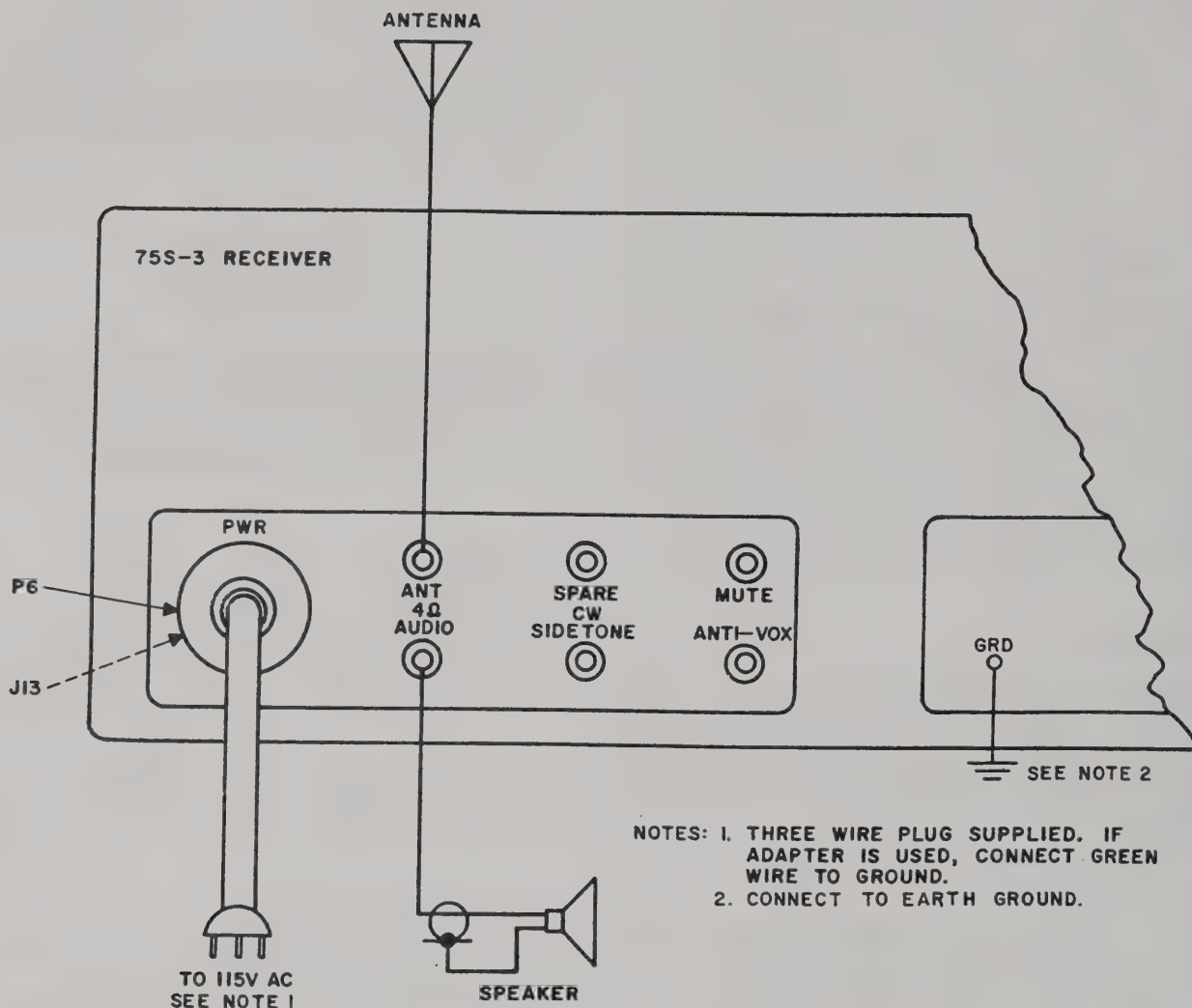
To connect the receiver for mute operation, a means of supplying a ground while receiving must be applied to the MUTE jack. Opening this circuit mutes the receiver. A set of normally closed contacts on a relay which is keyed with the transmitter may be used for this purpose. To use this circuit, the receiver must be operated in the STBY position.

The CW SIDETONE jack is a high-impedance, low-level audio input (0.2 volt rms, typical) to the receiver. Audio from a sidetone oscillator may be applied to this

TABLE 1-1. EQUIPMENT FURNISHED WITH 75S-3/3A

QUANTITY	DESCRIPTION	FUNCTION	PART NUMBER
2	Phono-type connectors	External connections	361-0062-00
1	Fuse, 2-ampere	Spare	264-4070-00
1	Power cord	A-c power	544-3121-00
1	Power plug adapter	A-c power	368-0138-00
1	Instruction book	75S-3/3A instructions	523-0148-00
1	Logbook	Station logging	523-0755-820
1	Cable marker card	Cable identification	280-2946-00
1	No. 4 Bristo wrench	Accessory tool	024-2900-00
1	No. 6 Bristo wrench	Accessory tool	024-9730-00
1	No. 8 Bristo wrench	Accessory tool	024-0019-00
1	No. 10 Bristo wrench	Accessory tool	024-9710-00

SECTION 1  
Installation



NOTES: 1. THREE WIRE PLUG SUPPLIED. IF ADAPTER IS USED, CONNECT GREEN WIRE TO GROUND.  
2. CONNECT TO EARTH GROUND.

Figure 1-1. External Connections

jack to provide a cw monitoring circuit through the receiver audio system.

The ANTI-VOX jack is a 500-ohm audio output from the receiver. At normal speaker volume levels, 5 to 10 volts rms is provided at this output. This voltage is normally applied to anti-vox circuits in an associated transmitter.

The PHONES jack on the front panel is connected through a resistive network to a 500-ohm tap on the output transformer. Therefore, best results will be obtained if headphones used are 500 ohms or higher impedance. The speaker is silenced when headphones are plugged in.

1.2.2 CABLING WITH 32S-3 TRANSMITTER. Figure 1-2 shows a complete station interconnection for a 75S-3 or 75S-3A Receiver, 32S-3 Transmitter, and

312B-4 Station Control. The RG-58C/U cables indicated are slightly larger in diameter and two inches shorter than the audio and control cables. If the 312B-4 is not used, connect a 4-ohm speaker, such as the 312B-3, to 4 Ω AUDIO jack on receiver. Connect ANTI-VOX jack on receiver directly to ANTI-VOX jack on transmitter. Omit PHONE PATCH and PTT connections.

To connect the 75S-3 or 75S-3A and the 32S-3 for transceiver operation, use the patch cables furnished with the transmitter, and connect as follows:

a. Connect the 32S-3 and 75S-3/3A as shown in figure 1-2.

b. Remove P1 from XMTR XTAL OSC jack J7 (under 32S-3 top cover), and plug it into 32S-3 RCVR XTAL OSC jack J6. Remove the 100-ohm dummy load plug from the 75S XTAL OSC OUTPUT jack, and plug it into 32S-3 XMTR XTAL OSC jack J7.



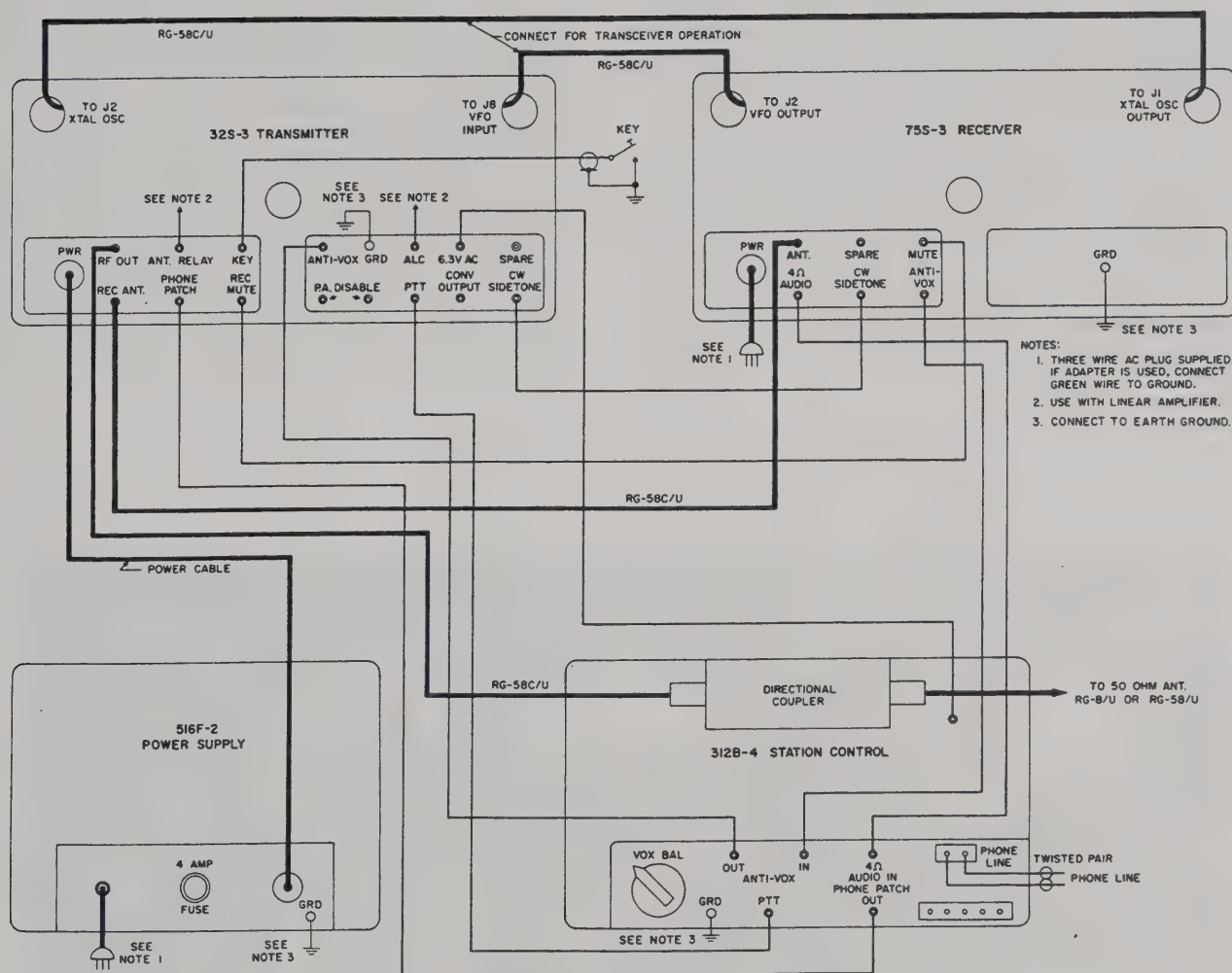


Figure 1-2. Station Interconnections

## SECTION 1

### Installation

**1.2.3 CABLING WITH KWM-2/2A TRANSCEIVER.**  
The 75S-3/3A may be used with a KWM-2/2A to provide separate transmit and receive frequencies. Connect the patch cables as follows:

a. Using an RG-58C/U patch cable, connect REC ANT jack on KWM-2/2A to ANT jack on 75S-3/3A.

b. Connect the 500  $\Omega$  jack on the KWM-2/2A to the ANTI-VOX jack on the 75S-3/3A. If a 312B-4 or 312B-5 is used, connect the KWM-2/2A 500  $\Omega$  jack to ANTI-VOX IN and the 75S-3/3A ANTI-VOX jack to ANTI-VOX OUT on the 312B-4/5.

c. Connect the REC MUTE jack J20 on the KWM-2/2A to the MUTE jack on the 75S-3/3A.

The station speaker may be plugged into either the 4  $\Omega$  jack on the KWM-2/2A or the 4  $\Omega$  AUDIO jack on the 75S-3/3A. For normal mute operation, set the 75S-3/3A function switch to STBY. Receiver output from the KWM-2/2A is turned off by setting AF GAIN to zero. For transmit and receive operation on the same frequency, reduce the 75S-3/3A AF GAIN to zero, and operate the KWM-2/2A in a normal manner.

### 1.2.4 CABLING WITH OTHER TRANSMITTERS.

a. To provide receiver muting when using 75S-3/3A with KWS-1, connect a cable from pins 5,6 on J102 (receiver disable) in the transmitter to MUTE jack on the receiver. Connect a cable from receiver ANTI-VOX jack to pin 7 on J102 (500-ohm audio) in the KWS-1. Connect cable shield to ground.

b. To use the 75S-3/3A with the 32V-3, connect a cable from the receiver MUTE jack to receiver disabling pins 24 and 25 on the transmitter.

c. To use the 75S-3/3A with other makes of transmitters, connect muting, cw sidetone, and anti-vox provisions in the receiver as applicable. The requirements for use are outlined in paragraph 1.2.1.

### 1.3 Initial Checks.

Lift the top cover, and make sure the dummy load (see figure 4-1) is plugged into the XTAL OSC OUTPUT jack unless the receiver is connected for transceiver operation. Recheck the interconnections to make sure the patch cables are plugged into the appropriate jacks. Be sure that RG-58C/U cables, rather than the audio and control cables, have been used for all r-f applications. Check to ensure the special Mu-Metal shields are in place on tube V11 and coil L10.

# section 2

## operation

### 2.1 Calibration.

- After making external connections, set controls as shown in figure 2-1.
- Set BAND switch (11) to desired frequency range. If receiver is 75S-3A, set crystal board selector (10) so desired set of bands appears in window.
- Set dial to 0, 100, or 200 with tuning knob (3).
- Adjust PRESELECTOR (2) for maximum signal or noise output.
- Tune back and forth near 0, 100, or 200 until calibrate signal is at zero beat.
- Adjust zero set knob (4) until dial is calibrated.

### 2.2 Single-Sideband Tuning.

- Set controls as shown in figure 2-1, except set function switch (1) to OPR, and the BFO knob fully counterclockwise until a click is heard.
- Set EMISSION switch (12) to desired sideband.
- Adjust PRESELECTOR (2) for maximum signal or noise output.
- Tune in signal and adjust AF GAIN (9) for desired audio output level.

When listening to strong signals, a reduction in background noise under no-modulation conditions may be

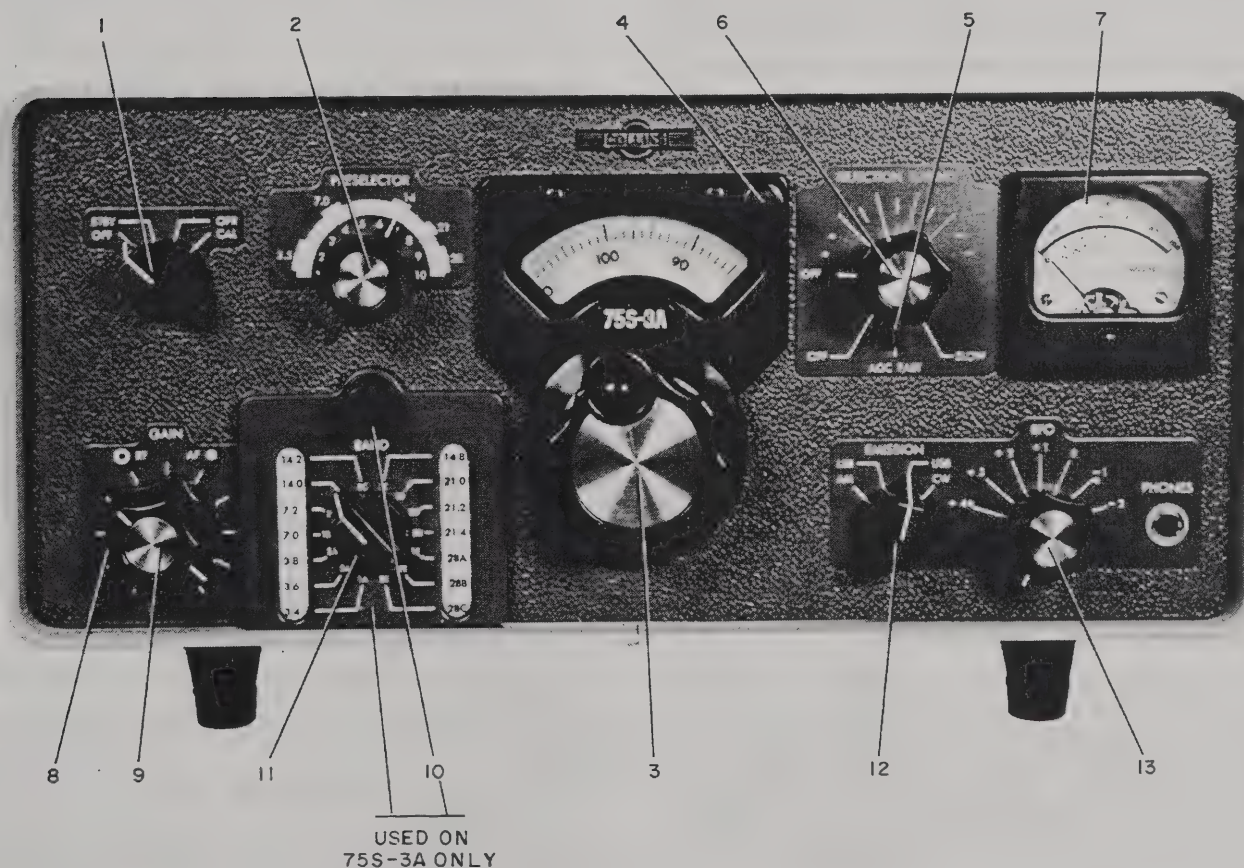


Figure 2-1. Operating Controls



## SECTION 2

### Operation

obtained by rotating RF GAIN control (8) counterclockwise, away from the maximum position. As this is done, S-meter (7) static reading will shift up scale. At proper gain control setting, meter will kick about one or two S-units on peaks. For example, if the weakest of the desired signals is peaking at S-9, set gain control so that static meter reading is S-7 to S-8. This retains accurate meter readings.

To read frequency, add the dial setting to the BAND switch setting. For example, if the BAND switch is set to 3.8 and the dial is set to 5, the frequency is 3.805 mc. If the BAND switch is set to 3.8 and the dial to 170, the frequency is 3.970 mc.

#### 2.3 CW Tuning.

- Set controls as outlined in paragraph 2.2 except set EMISSION switch to CW.
- Rotate the BFO knob (13) clockwise to energize the tunable bfo. Set to either +1 or -1.
- Adjust BFO knob to yield the most pleasing beat note with the desired signal centered in the filter pass band.
- Read approximate frequency as follows: When BFO knob is set to the plus side of zero, add kilocycle reading from bfo scale to dial reading. Subtract bfo reading for minus settings of the knob. If a precision reading is desired, set the BFO knob, and recalibrate the main tuning dial using the crystal calibrator. When the main dial is calibrated in this manner, further adjustment of the BFO knob or switching to the crystal-controlled BFO requires recalibration of the dial.

Either fast or slow AGC (5) may be used, or it may be turned off. If AGC is turned off, decrease RF GAIN control setting to prevent receiver overloading. Adjust AF GAIN control to provide desired audio level. In general, it is best to set r-f gain at a point just below that which causes signal to overload receiver. This provides optimum sensitivity.

Tuning may be facilitated by switching first to USB to tune in the desired signal and then switching to CW to reduce interference. The beat note will be the same in either position. The wider pass band provided in USB is also useful for net operation.

#### 2.4 AM Tuning.

- Set controls as outlined in paragraph 2.2.
- Set EMISSION switch to AM.
- Set AGC switch to FAST.
- Tune in signal, and adjust AF GAIN for desired audio output level.

If desired, SSB methods may be used for AM reception. Set EMISSION switch to either USB or LSB position; use tuning procedure for a single-sideband signal. Once the desired signal is tuned in, switching to the opposite sideband may yield a more readable signal. This method of reception is useful under conditions of severe interference or extreme fading.

#### 2.5 RTTY Tuning.

This type of operation requires an external RTTY converter and printer. Tune receiver as follows:

- Set controls for SSB reception as outlined in paragraph 2.2 with EMISSION switch in USB position.
- Turn on tunable bfo by rotating BFO knob (13) clockwise.
- Set the pointer on the BFO tuning knob at the dot near -1 on the calibrated scale.
- Tune the receiver for maximum S-meter reading on the desired RTTY signal.
- Fine adjustment of the BFO tuning knob then will produce 2125 cps and 2975 cps mark and space signals at the receiver audio output. To reverse the mark and space signals, reset the BFO tuning knob to the dot near +4 on the calibrated scale.

#### 2.6 Rejection Tuning.

An interfering heterodyne or cw signal may be reduced in level or eliminated by operation of the REJECTION TUNING knob (6). The off position for this control is at the end of extreme counterclockwise rotation. The on-off switch is provided with a positive stop rather than a detent. Do not force the knob. Clockwise rotation of the knob from the off position moves the rejection notch across the receiver pass band. It is recommended that the operator familiarize himself with the operation of this control by tuning the notch across the signal from the crystal calibrator.

When the receiver is initially placed in operation, it may be necessary to touch up the adjustment of R77. Refer to paragraph 4.5.8.

#### 2.7 Use of S-Meter.

The S-meter is intended primarily to indicate relative rather than absolute signal strength. A nominal meter reading of S-9 is obtained with an input signal of 100 microvolts. The threshold of agc operation is set at the factory to a nominal value of 1.5 microvolts. Due to normal tolerances in receiver operation, agc threshold varies slightly from band to band causing correspondingly slight changes in the number of db represented by each S-unit. The db scale is calibrated with 1 microvolt as a reference; therefore, an S-9 signal of 100 microvolts represents a 40-db increase over the reference signal level. Since agc is not applied to very weak signals, S-zero is arbitrarily established at 10 db on the scale. Typical meter readings, therefore, can represent from 3.3 to slightly over 4 db per S-unit. A figure of 4 db can be taken as an average.

#### 2.8 Transceiver Operation with 32S-3 Transmitter.

- Make sure patch cables are connected as outlined in paragraph 1.2.2.
- Set FREQ CONTROL (1) on 32S-3 to REC VFO position.
- Set OFF-STBY-OPR-CAL switch on 75S-3/3A to STBY position.
- Set both BAND selectors to the same desired band and both EMISSION switches to the same position (either USB, LSB or CW).
- Tune both receiver and transmitter as in normal operation. Both transmit and receive functions operate from the receiver vfo; the transmitter vfo is not used

in transceiver operation. Switching the transmitter FREQ CONTROL (1) back to TRANS VFO position will allow separate operation of the two units within the same 200-kc band.

## NOTE

In CW transceiver operation, the 75S variable bfo will have to be used to obtain the desired beat note if it is desired to transmit zero beat with another station.

**CAUTION**

When operating in transceiver service, do not operate the transmitter while the receiver is tuned outside band limits; the transmitted signal will be out of the band. Do not attempt operation with receiver and transmitter set on different 200-kc bands, even when operating in TRANS VFO position. With patch cables connected for transceiver operation, the receiver h-f crystal oscillator controls injection frequency to the transmitter second mixer.

If operation on different 200-kc bands is desired (that is, receive on one 200-kc band and transmit on another), remove the transceiver patch cables and operate the units as in normal independent operation.

If transmitted frequency is changed by any great amount, be sure to redip the PA plate current and check the loading. This will be most important on the 80- and 40-meter bands.

Some operating experience will indicate the amount of frequency excursion possible without readjustment.

Do not attempt operation in transceiver service with any other receiver not having the same frequency mixing scheme.

f. To restore both units to normal operation, remove the two patch cables connecting oscillator signals, replace P1 in J7 on the transmitter slug rack (under top cover), and replace the 100-ohm load plug in the receiver XTAL OSC OUTPUT jack.

## 2.9 Operation Outside Amateur Bands.

Additional 10-meter band coverage, or coverage outside the amateur bands may be obtained by plugging an appropriate crystal into the crystal mounting board. Two extra sockets are provided in the mounting board for this purpose. The total 3.4- to 30.0-megacycle coverage available is divided into five segments, designated A, B, C, D, and E. The frequency range of each of these segments is listed in the total coverage column of table 2-1. The letter portions of the crystal socket locations shown in figure 2-2 indicate which sockets may be used for crystals to cover a 200-kc band within a specific total coverage segment. For example, crystals for extended 10-meter coverage must be plugged into sockets marked E.

The proper crystal for coverage of a specific 200-kc band may be selected as follows:

a. If the lower edge of the desired band is 11.8 mc or less, the required crystal frequency is equal to the

TABLE 2-1. CRYSTAL FREQUENCIES AND OPERATING BANDS

BAND-SWITCH POSITION	FREQUENCY BAND	CRYSTAL SUPPLIED	CRYSTAL SOCKET CONNECTED	TOTAL COVERAGE
1A - 3.4	3.4 - 3.6 mc	6.555 mc	1A	A 3.4 - 5.0 mc
2A - 3.6	3.6 - 3.8 mc	6.755 mc	2A	
3A - 3.8	3.8 - 4.0 mc	6.955 mc	3A	
1B - 7.0	7.0 - 7.2 mc	10.155 mc	1B	B 6.5 - 9.5 mc
2B - 7.2	7.2 - 7.4 mc	10.355 mc	2B	
1C - 14.0	14.0 - 14.2 mc	8.5775 mc	1C	C 9.5 - 15.0 mc
2C - 14.2	14.2 - 14.4 mc	8.6775 mc	2C	
3C - 14.8	14.8 - 15.0 mc	8.9775 mc	3C	
1D - 21.0	21.0 - 21.2 mc	12.0775 mc	1D	D 15.0 - 22.0 mc
2D - 21.2	21.2 - 21.4 mc	12.1775 mc	2D	
3D - 21.4	21.4 - 21.6 mc	12.2775 mc	3D	
1E - 28A	28.5 - 28.7 mc	15.8275 mc	2E	E 22.0 - 30.0 mc
2E - 28B	As selected	Not supplied	2E	
3E - 28C	As selected	Not supplied	3E	



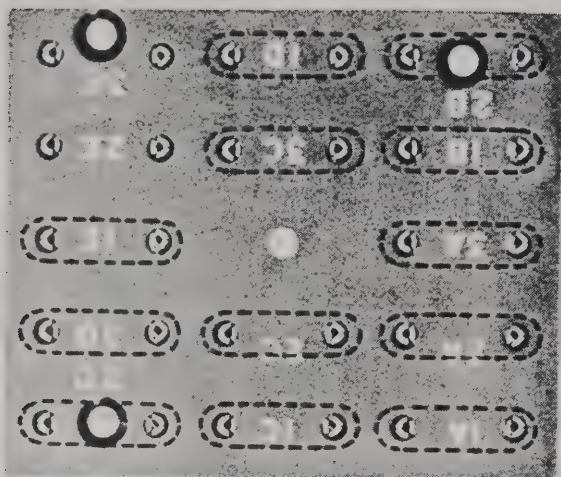


Figure 2-2. Crystal Socket Locations

lower edge of the desired band plus 3.155 mc. For example, if the desired band is 4.0 to 4.2 mc, the required crystal frequency is 7.155 mc.

b. If the lower edge of the desired band is 12.0 mc or higher, the required crystal frequency is equal to half the sum of the desired lower band edge and 3.155 mc. For example, if the desired band is 14.4 or 14.6 mc, the required crystal frequency is 8.7775 mc.

Extra crystals available are listed in section 6, Parts List.

Approximate settings for the PRESELECTION are shown in figure 2-3. For example, if coverage from 10.0 to 10.2 mc is desired, plug the appropriate crystal into a socket marked C, turn the BAND switch to that position, and set the PRESELECTION to approximately 3.2 on the logging scale. Peak the PRESELECTION tuning as in normal operation. The ANT, RF, and OSC trimmer capacitors (those marked C in the example above) may also be peaked if optimum performance is desired at frequencies outside the amateur bands. On some bands it is possible to peak the PRESELECTION tuning at an image frequency or at a different order of output frequency from the crystal oscillator; however, there is only one correct setting for coverage within a given 200-kc band.

The above information also applies to the 75S-3A except that two crystal mounting boards are provided in this receiver. The amateur-band board is located under the chassis. To obtain access, refer to paragraph 4.1. When crystal board selector (10) is switched to extended coverage position, the above-chassis board is switched into the circuit. The crystal socket locations are the same for both boards. Space is provided in the window adjacent to the BAND switch to mark in-band information. A pencil may be used to allow erasure if changes are made.

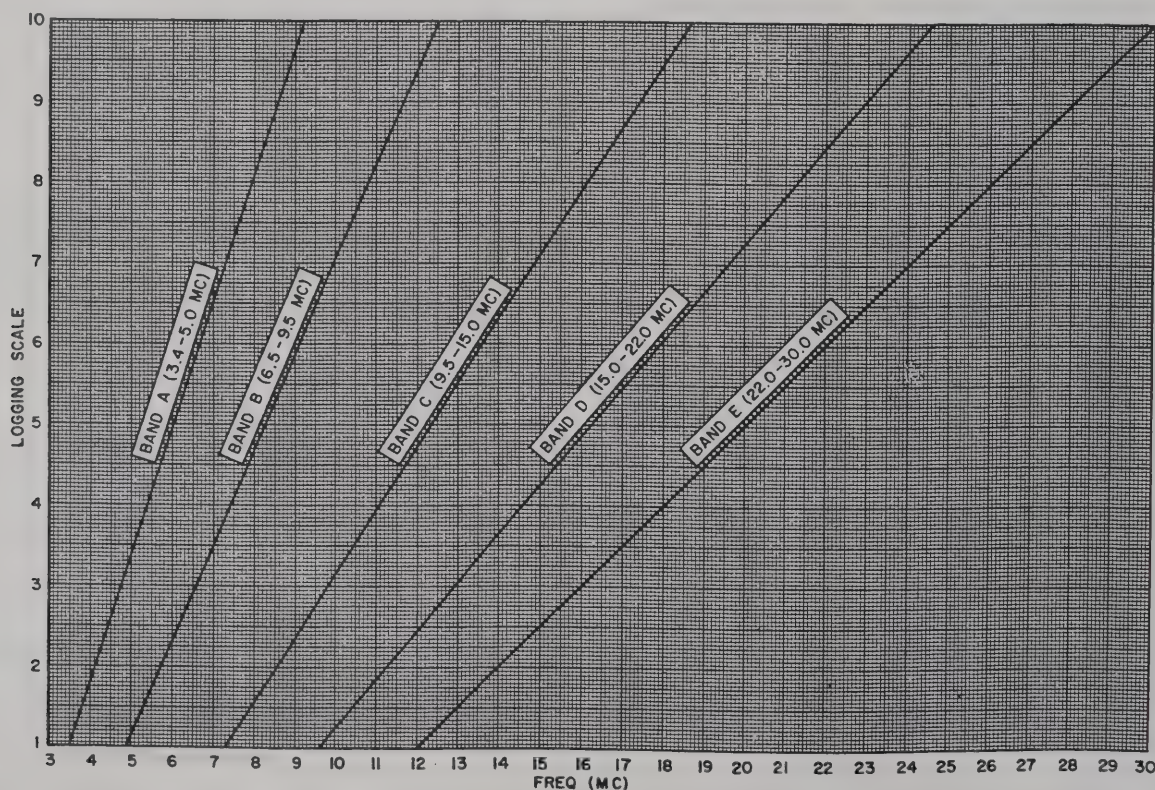


Figure 2-3. Preselector Calibration Curves



## principles of operation

### 3.1 Block Diagram.

Figure 3-1 is a block diagram for 75S-3 and 75S-3A Receivers. Double conversion is used, with injection voltage for the first conversion provided by a crystal-controlled oscillator. A band-pass i-f, 200 kilocycles wide, is used to couple the first and second mixers. Injection voltage for the second mixer is furnished by a vfo with a tuning range of 200 kc. The 455-kc output frequency of the second mixer is coupled through the i-f system to separate AM and SSB detectors. Injection voltage for the product detector is provided by either a crystal-controlled bfo or a tunable bfo. The 75S-3A is identical to the 75S-3 except that it is equipped with an extra h-f crystal mounting board on the chassis, a crystal board selector switch on the front panel, and associated components. Figure 7-1 is a schematic diagram for both receivers, with circuit differences noted.

### 3.2 R-F and Mixer Circuits.

The r-f amplifier grid, high-frequency mixer grid, and crystal oscillator plate circuits are resonated by slug-tuned coils. The slugs are mechanically ganged and linked to the PRESELECTOR tuning knob. The required tuning ranges of these circuits are obtained by switching appropriate values of fixed capacitance in parallel with the coils. The total 3.4- to 30-mc tuning range of the receiver is divided into five segments for band-switching purposes, as noted in table 2-1. The tuned circuit LC ratio is thereby varied within appropriate limits for each of the five segments.

Signals within the particular 200-kc band selected are amplified by V2, the r-f amplifier, and coupled to the control grid of V3A, the first mixer. Injection voltage is coupled to the cathode of V3A. Products of mixing are selected in the plate circuit of V3A, tuned to 3.155 to 2.955 mc which is the band-pass i-f frequency. Signals are coupled to the control grid of second mixer V4A with vfo injection voltage applied to the cathode of this tube.

### 3.3 Oscillator Circuits.

**3.3.1 CRYSTAL OSCILLATORS.** High-frequency crystal oscillator V3B provides injection voltage for the first mixer. The crystal oscillator output frequency is always 3.155 mc higher than the lower edge of the selected band. On bands below 12.0 mc, the oscillator plate circuit is tuned to the crystal frequency. At 12.0 mc and higher, the plate circuit is tuned to the second harmonic. The secondary winding of T2 couples injection voltage to the first mixer cathode circuit and furnishes a d-c return

to ground for mixer tube V3A. Dummy load R41 stimulates the load presented by the 32S-3 Transmitter when connected for transceiver operation.

Crystal-controlled bfo V8B and associated circuitry furnishes injection voltage for the product detector. Crystals Y15 and Y16 provide the proper bfo frequency relationships to the mechanical filter passband to yield optimum audio response from the product detector. Crystal Y15 is used for lower sideband reception, and Y16 is used for upper sideband. Capacitor C95 and coil L-12 form a broadly resonant circuit at 455 kc. Oscillator voltage is developed across R49 and coupled by C100 to the cathode of V8A, the product detector tube.

The crystal calibrator circuit provides marker signals at multiples of 100 kc. Variable capacitor C61 provides for adjustment to zero beat with WWV. The output of this oscillator is coupled to the receiver antenna circuits.

**3.3.2 VARIABLE OSCILLATORS.** The vfo uses fixed capacitance and variable inductance to produce the required tuning range of 2.5 to 2.7 mc. Capacitor C303, in the frequency-determining network, is paralleled by variable capacitor C308 in series with diode CR301. This diode switches C308 in or out of the circuit, depending upon the polarity of a bias voltage impressed across the diode junction. The bias voltage is coupled to the diode through R303, and is positive in the USB position causing CR301 to switch C308 into the circuit. When C308 is properly adjusted, it shifts the vfo frequency by an amount equal to the frequency separation of crystals Y15 and Y16. This allows either sideband to be selected without retuning or recalibrating the dial. The vfo output voltage is coupled to the cathode of second mixer tube V4A and to the control grid of cathode follower V4B. The cathode follower prevents loading of the vfo circuits by cable capacity when operated in transceiver service.

Tube V11 and associated circuitry comprise a tunable bfo. The bfo tuning control is potentiometer R81. This control varies a positive d-c voltage applied to the junction of voltage-variable capacitor CR4. The junction capacity of this device is proportional to applied voltage. Adjustment of R81 therefore varies the output frequency of the bfo. Voltage for the tuning circuit is stabilized by a regulator consisting of Zener diode CR5 and resistor R82. Switch S13 completes the cathode circuit of either V8B or V11 thus turning on the desired bfo

## SECTION 3

### Principles of Operation

and turning off the other. The output circuits of both oscillators are coupled to the product detector.

#### 3.4 I-F And Detector Circuits.

Output from the second mixer is coupled to either one of two band-pass filters or 455-kc tuned circuits. A mechanical filter with 2.1-kc nominal bandwidth is provided for SSB reception. A band-pass crystal filter with 250 cps nominal bandwidth is selected in the CW position. For AM reception, two cascaded 455-kc transformers provide increased bandwidth. Output from these circuits is coupled through the Q-multiplier to the first i-f amplifier, V6. The cathode of V6 is returned to ground through potentiometer R57 which is used to set the gain of this stage at a point producing the proper agc threshold. The S-meter circuit is connected from the screen circuits of V6 and V7, the two i-f amplifiers, to the cathode of V7. Under no-signal conditions, the voltage developed across R13 is equal to that developed across R17, and the meter reads zero. Application of agc causes the cathode current of V7 and the combined screen current of V6 and V7 to decrease. The voltage across R17 increases, the voltage across R13 decreases, and the meter reads up-scale by an amount which is proportional to signal strength. Output voltage from the second i-f amplifier is coupled to the product detector, V8A. It is also coupled to separate AM and agc diode detectors. Injection voltage is applied to the cathode of the product detector.

#### 3.5 Q-Multiplier And Notch Filter.

The notch filter is composed of coil L8 and associated capacitors and resistors. The rejection notch occurs at the resonant frequency of this circuit and is centered at 455 kc. Capacitor C132 is mechanically coupled to the REJECTION TUNING control which allows the notch frequency to be moved across the receiver i-f passband. Potentiometer R77 is adjusted to provide optimum Q and depth of notch. Switch S10 shorts the filter circuit in the OFF position. The Q-multiplier is a feedback circuit which includes L8. This circuit multiplies the Q of L8 approximately ten times, thereby obtaining a much deeper and narrower rejection notch than would be provided by the filter alone. The notch shape provided by this circuit allows unwanted signals to be rejected with minimum disturbance to desired signals.

#### 3.6 AGC And Control Circuits.

Signal voltage is coupled from the secondary of transformer T6 to one of the diode plates in V9 and rectified. Agc voltage is developed across R24, the diode load resistor, and is applied to the r-f and i-f amplifier stages. Signal voltage is filtered from the agc line by R50 and C49. Generation of agc voltage is delayed until the signal voltage at the diode plate exceeds the cathode bias on V9. Potentiometer R57 in the cathode

of the first i-f amplifier tube is normally adjusted so that agc action is initiated with a receiver input signal of approximately 1.5 microvolts. This point is referred to as agc threshold. Agc time constant is determined by the amount of capacitance placed in parallel with R24. Added capacity in the SLOW position of the AGC selector produces a slower release characteristic.

Manual control of r-f gain is also accomplished through the agc line. A voltage divider circuit, consisting of resistors R33, R55, and RF GAIN control R56, is connected across the negative 65-volt bias line. At the maximum gain setting, this circuit places a one-volt static bias on the agc line to furnish proper operating bias for r-f amplifier V2. At lower control settings, increased bias is provided which reduces the gain. The d-c grid return for the first mixer stage and MUTE jack J11 are connected to the junction of resistors R33 and R58. When the receiver function switch is placed in the STBY position, a ground at J11 causes the receiver to operate in a normal manner. Removal of this ground causes cutoff bias to be applied to the mixer grid and increased bias on the agc line, thus muting the receiver.

#### 3.7 Audio Circuits.

Audio voltage from the appropriate detector is selected by S8A on the EMISSION switch, and is coupled to the AF GAIN control. The CW SIDETONE jack, J10, is also connected to this point. A sidetone audio voltage of approximately 0.2 volt will produce a normal listening level at average gain settings. Audio is amplified in a two-stage amplifier consisting of tubes V8 and V10. Three audio outputs are provided. Jack J8 is a 4-ohm outlet for a speaker. The headphone jack is connected to a resistive divider across the 500-ohm tap on the output transformer. The divider provides a load for V10 when the impedance of headphones used is relatively high. The ANTI-VOX jack, J12, is also connected to the 500-ohm tap. At normal audio gain settings, 5 to 15 volts of audio are available at J12 for use with the anti-vox circuits in an associated transmitter.

#### 3.8 Power Supply Circuits.

The internal power supply furnishes filament, plate, and bias voltages for the receiver. Bias voltage is obtained by rectifying a portion of the a-c voltage appearing from one leg of the high-voltage secondary to ground. The tube filaments and pilot lamps are connected in a way which allows operation from a 6-, 12-, or 24-volt source. Filament, plate, and bias voltages may be furnished by an external source such as a mobile power supply. Figure 7-1 illustrates the proper connections to the power plug for this type of operation.



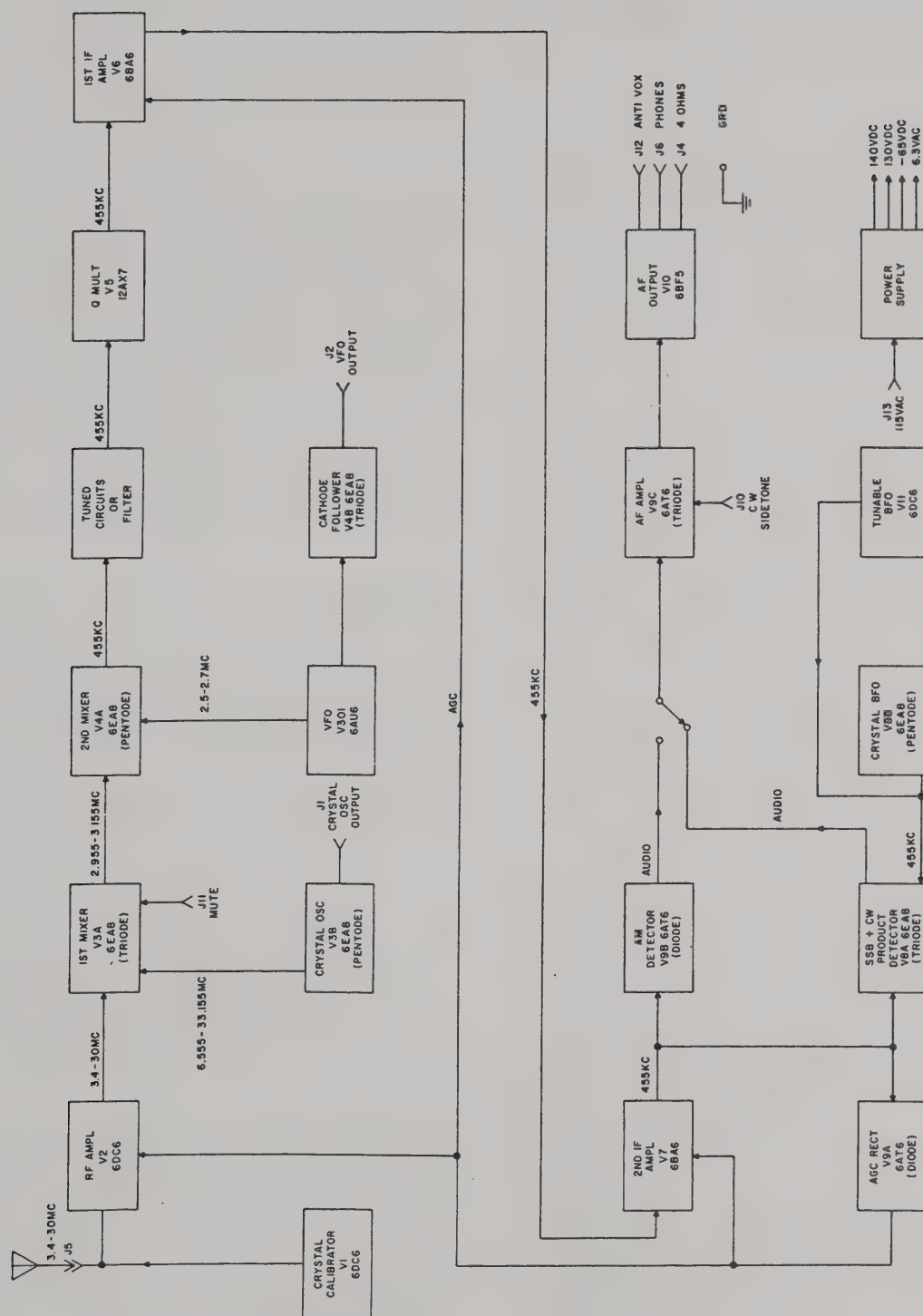


Figure 3-1. Block Diagram





## service instructions

### 4.1 General.

This section covers maintenance and service of 75S-3 and 75S-3A Receivers. It includes information on trouble analysis, signal tracing procedures, voltage and resistance measurements, and alignment procedures. The usefulness of signal level and alignment data given depends upon the accuracy of the test equipment used. Minor adjustments in alignment may be made using the crystal calibrator as a signal source. Except for an occasional touch-up to compensate for possible component aging, alignment normally will be necessary only if frequency-determining components have been replaced. If servicing requires that the cabinet be removed, proceed as follows:

- a. Disconnect all power and external connections.
- b. Lift the lid, and remove the two screws located at the front edge of the cabinet.
- c. Remove the four feet and the screw located midway between the rear feet.
- d. From the rear, push the receiver chassis forward until the front panel protrudes from the cabinet about an inch.
- e. Grasping the front panel at the edges, slide the receiver out of the cabinet.

#### NOTE

DO NOT lubricate the 70K-2 vfo shaft bearings or the dial drive system bearings. The vfo shaft bearings are lubricated at the factory with a special grease. Dial bearings are the Oilite type which are self-lubricating.

Tube filaments and pilot lamps are connected in series-parallel arrangements for 12- or 24-volt operation. When making tube or lamp replacements, be sure that rated filament currents are the same as the original units.

### 4.2 Trouble Analysis.

Most cases of trouble can be traced to defective tubes. Many tube checkers can not duplicate the conditions under which the tubes work in the receiver. Substitution of new tubes will sometimes clear an obscure case of tube trouble. Intermittent trouble conditions in tubes can usually be discovered by lightly tapping the envelope. Occasionally, tube pins or socket terminals will become dirty or

corroded causing an intermittent condition. When this situation is suspected, remove the tube and apply a few drops of contact cleaner to the tube pins. Replace the tube, and work it up and down in the socket a few times. Shorted tubes or capacitors will often cause associated resistors to overheat and crack, blister, or discolor. Making the measurements listed in table 4-1 will help to isolate this type of trouble to a particular stage or component.

A logical process of elimination in conjunction with a study of the main schematic diagram, block diagram, and section 3 will aid in isolating trouble. For example, if the receiver functions properly in the AM position but fails to operate in the SSB or CW positions, trouble in the product detector should be suspected because this circuit is not used for AM reception. As a further check, both beat-frequency oscillators should be alternately switched into the circuit to see if one has failed. A third possibility would be that both beat oscillators have failed.

If the receiver is to be returned to the factory or an authorized service agency, a detailed report of operational difficulties will assist the servicing agency in making repairs with a minimum of time and expense. This is particularly important when intermittent trouble is involved.

### 4.3 Voltage And Resistance Measurements.

Table 4-1 lists typical voltage and resistance readings at each tube socket terminal except those of the vfo tube, V301. Do not open the vfo can. Make all measurements under the following conditions:

- a. Unless otherwise noted in the table, set RF GAIN at maximum, AF GAIN at minimum, EMISSION switch in USB position, function switch in OPR position, tunable bfo off, REJECTION TUNING OFF, and AGC in the FAST position.
- b. Voltage measurements are made with power connected.
- c. Resistance measurements are made with all external cables, including power cable, disconnected. Resistances of less than one ohm are listed as zero.
- d. Make all measurements from indicated socket terminal to chassis ground.

It is recommended that a vtvm be used for these measurements. A vom may be used if it has an input resistance of not less than 20,000 ohms per volt. Voltage measurements made with a vom will yield lower readings in high impedance circuits such as the agc line. Do not use a vom for r-f measurements.

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Service Instructions

TABLE 4-1. VOLTAGE AND RESISTANCE MEASUREMENTS

TUBE	TUBE SOCKET TERMINAL								
	1	2	3	4	5	6	7	8	9
V1 CAL ON DCV CAL OFF DCV ACV OHMS	-52 0 1 MEG	+0.7 52 1000*	0 0	6.3 0	105 142 230K**	51 142 220K**	0 0 0		
V2 DCV ACV OHMS	-0.8 6 MEG	0 0	0 0	6.3 0	138 18K** ①	72 60K**	0 0		
V3 DCV ACV OHMS	112 18K** ①	-11 100K	130 17K** ①	0 0	6.3 0	130 17K** ①	0 0	3.6 1000	0 230K
V4 DCV ACV OHMS	120 18K** ①	0 82	120 18K** ①	6.3 0	0 0	120 19K** ①	4.4 1000	5.4 680	2.7 100K
V5 DCV ACV OHMS	138 18K** ①	-0 100K	1.1 680	0 0	0 0	143 18K** ①	0 340K	1.1 680	6.3 0
V6 DCV ACV OHMS	-0.8 3.7 MEG	0 0	0 0	6.3 0	138 0	74 19K** ①	2.2 22K ①		
V7 DCV ACV OHMS	-0.8 3.6 MEG	0 0	0 0	6.3 0	138 19K** ①	72 23K** ①	0.62 85		
V8 DCV ACV OHMS	46 120K**	-3.2 1 MEG	48 240K**	6.3 0	0 0	112 20K** ①	0 0 ②	0 5	-2.7 5600
V9 DCV ACV OHMS	1.1 680K	2.7 12K	6.3 0	0 0	-0.9 3.5 MEG	0 CW, SB 23 AM ∞ CW, SB 220K AM	100 120K**		
V10 DCV ACV OHMS	-11 250K	0 0	6.3 0	0 0	127 18K** ①	122 18K** ①	-11 250K		
V11 ON DCV OFF DCV ACV OHMS	-2 0 47K	0 25 0 ③	6.3 0	0 0	128 128 20K** ①	30 128 38K**	0 0 0		

\*FUNCTION switch in CAL position

\*\*Resistance may vary depending upon diode and electrolytic condition

① Reverse VOM leads and take highest of the two readings

② Tunable BFO switch OFF

③ Tunable BFO switch ON



TABLE 4-2. SIGNAL LEVELS

SIGNAL INJECTION POINT	GENERATOR OUTPUT FREQUENCY	GENERATOR OUTPUT VOLTAGE	NORMAL INDICATION
V10 - pin 1	1000 cps	5.4 volts	1-watt audio output
V9 - pin 1	1000 cps	0.2 volt	1-watt audio output
V8 - pin 9	455 kc	75 millivolts	1-watt audio output
V8 - pin 6	BFO INJECTION		1.65 volts r-f (each bfo)
V7 - pin 1	455 kc	48 millivolts	Agc threshold
V6 - pin 1	455 kc	175 microvolts	Agc threshold
V4 - pin 6	455 kc	1400 microvolts	Agc threshold
V4 - pin 7	VFO INJECTION		2.0-2.5 r-f volts
V4 - pin 2	3.055 mc	100 microvolts	Agc threshold
V3 - pin 8	HF OSC INJECTION		0.8-2.0 r-f volts
V3 - pin 9	14.1 mc	30 microvolts	Agc threshold
V2 - pin 1	14.1 mc	9 microvolts	Agc threshold
J5 (ANT)	14.1 mc	1.5 microvolts	Agc threshold

#### 4.4 Signal Tracing.

Appropriate test points and normal signal levels are listed in table 4-2. The values listed are nominal. Signal levels in a given receiver may differ from those listed by a factor of plus or minus 20 percent without noticeable degradation in performance. A signal generator with an accurately calibrated output attenuator must be used to provide the r-f signal source voltages indicated. A Hewlett-Packard model 606A or equivalent generator is recommended for this purpose. Be sure to consult the signal generator instruction book for information regarding output termination requirements. Measurements of oscillator injection voltages require the use of an r-f vtvm such as the Hewlett-Packard model 410B. Make r-f and audio measurements under the following conditions:

a. For audio measurements, use an audio oscillator as the signal source and an a-c vtvm or calibrated oscilloscope to monitor receiver audio output. If desired, an audio wattmeter may be used. Set AF GAIN at maximum, and terminate the 4 $\Omega$  AUDIO output with a four-ohm resistive load.

b. Oscillator injection voltages are measured with an r-f vtvm. Measure from cathode to chassis ground at the associated mixer or product detector tube.

c. To check r-f signal levels, connect a d-c vtvm to the receiver agc line. Set RF GAIN at maximum. Static d-c voltage on the agc line should be approximately -1.0 volt. Connect the r-f signal generator to the point indicated in the table, and rock the generator dial to produce maximum agc voltage. Starting from minimum output, increase signal generator output to the point where a further increase in signal produces a slight increase in agc voltage. This is agc threshold. Note generator output voltage, and compare with the value listed in the table.

#### 4.5 Alignment Procedure.

Complete alignment of the receiver may be accomplished using the crystal calibrator as a signal source and the S-meter as a peak indicator. To provide a variable output attenuator for the calibrator, connect a .001-uf capacitor to one end of a 5000-ohm carbon potentiometer. Temporarily connect the free end of the capacitor to tube socket terminal 5 of V1, the crystal calibrator. Connect the rotating contact of the potentiometer to ground. Figure 4-1 shows the location of adjustments except for the filter input and output trimmer capacitors. These trimmers are located under the chassis adjacent to the mechanical and crystal filters. The

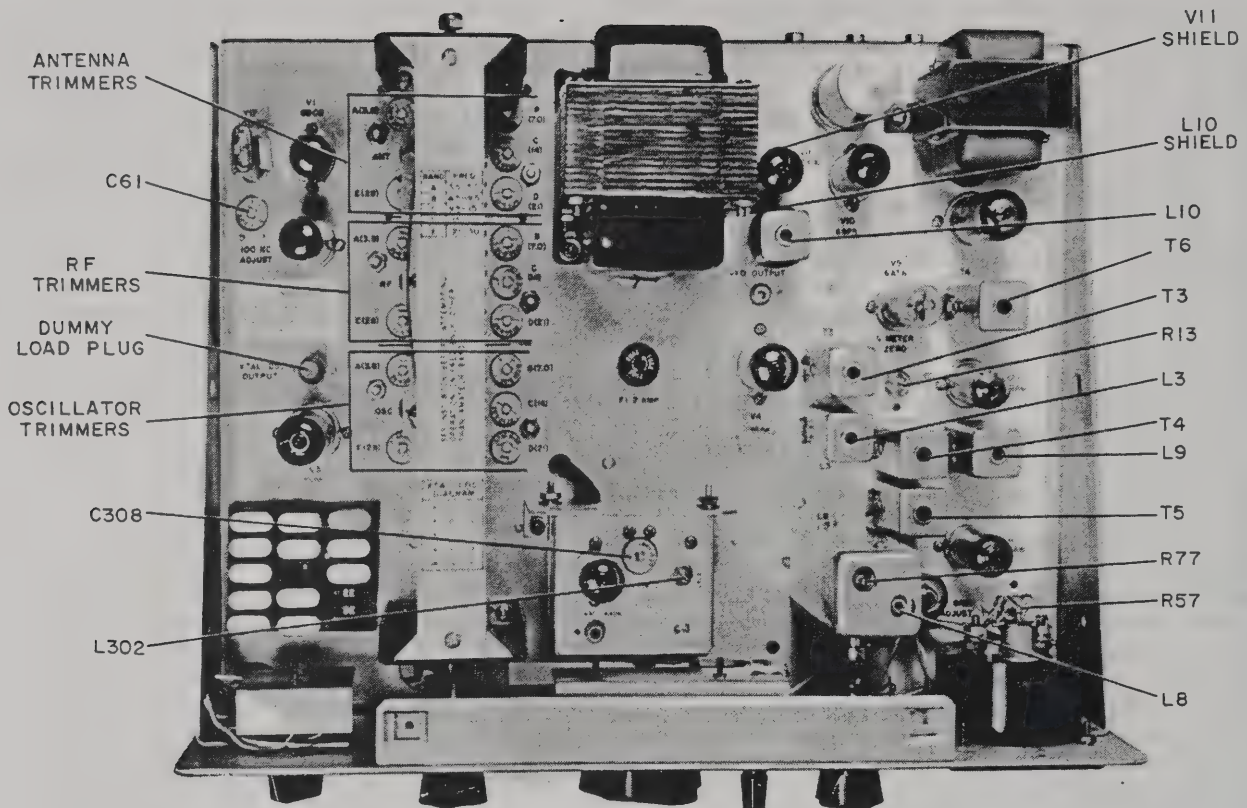


Figure 4-1. Location of Adjustments

rotary ceramic trimmers used in the receiver are at maximum capacity when the large notch is positioned midway between the two mounting screws. Rotation in either direction from this position reduces capacity with minimum being at 180 degrees from maximum.

#### 4.5.1 455-KILOCYCLE I-F ALIGNMENT.

- Set EMISSION switch to USB, and tune to the calibrate signal at 3.7 mc.
- Adjust calibrator output attenuator to provide S-meter reading of approximately S-3.
- Adjust the slugs of L9 and T6 for peak meter reading. Reduce calibrator output as necessary to maintain a low meter reading. Repeat L9 and T6 adjustments.
- Adjust C122 and C123, SSB filter input and output trimmers, for peak meter reading.
- Switch to CW position, and adjust C126 and C127, CW filter input and output trimmers, for

peak meter reading. Rock receiver tuning dial to make sure signal is centered in filter passband.

f. Switch to AM position, and adjust top and bottom slugs of T4 and T5 for peak meter reading. This completes alignment.

g. If a signal generator is used for this alignment, remove vfo tube V301, connect generator to pin 2 of V4, and adjust frequency to center of filter pass band. Align as outlined above, disconnect generator, and replace V301.

#### 4.5.2 BAND-PASS I-F ALIGNMENT.

- Set EMISSION switch to CW, and tune to the calibrate signal at 3.7 mc.
- Make two swamping networks by connecting a .01-uf capacitor in series with a 1000-ohm resistor and connecting alligator clips to the two remaining leads.



c. Connect one swamping network from T3 primary (terminal 1) to ground and the other from L3 (terminal 1) to ground.

d. Adjust attenuator to provide meter reading of approximately S-3.

e. Peak the secondary of T3 (top of can) using a Walsco 2543 or equivalent type tuning tool.

f. Remove both swamping networks and swamp T3 secondary (terminal 3 to ground). Peak T3 primary (bottom of can), and peak L3.

g. Remove swamping network from T3 secondary. This completes band-pass i-f alignment.

h. If a signal generator is used for this alignment, disable the h-f crystal oscillator by removing the crystal for the 3.6-mc band. Connect the signal generator to the XTAL OSC OUTPUT jack, and set to 3.055 mc. Tune receiver to the generator signal at approximately 100 on the dial. Align as above, disconnect generator, and replace crystal.

#### 4.5.3 R-F CIRCUIT ALIGNMENT.

a. Tune to the calibrate signal at 3.7 mc with the EMISSION switch in either USB or LSB position. Connect a 47-ohm resistor or a dummy load such as the DL-1 to the 75S-3/3A ANT jack. During the following procedures, adjust the calibrator output attenuator as necessary to maintain a meter reading of approximately S-3.

b. Set both A (3.8) RF and ANT trimmer capacitors so the large notches point to approximately 2 o'clock when viewed as shown in figure 4-1. Set the A (3.8) OSC trimmer so the large notch points to the rear of the chassis.

c. Set the PRESELECTOR to 2.1 on the logging scale.

d. Adjust the OSC, RF, and ANT slugs located on the movable platform the maximum S-meter indication. Adjust the OSC slug first. After making these adjustments, make sure the PRESELECTOR tuning peaks at 2.1 on the logging scale.

e. Set BAND switch to 28A, PRESELECTOR to 8.9 on the logging scale, and tune to the calibrate signal at 28.6 mc. Maintain S-3 signal level.

f. Adjust E (28) OSC, RF, and ANT trimmer capacitors for peak S-meter reading. Adjust OSC trimmer first.

g. Set BAND switch to 21.0 and PRESELECTOR to 7.9 on the logging scale. Tune to calibrate signal at 21.1 mc. Maintain S-3 signal level.

h. Adjust D (21) OSC, RF, and ANT trimmers for peak S-meter reading. Adjust OSC trimmers first.

i. Set BAND switch to 14.8 and PRESELECTOR to 7.0 on the logging scale. Tune to calibrate signal at 14.9 mc. Maintain S-3 signal level.

j. Adjust C (14) OSC trimmer for peak S-meter reading.

k. Set BAND switch to 14.2 and PRESELECTOR to 6.6 on the logging scale.

l. Adjust C (14) RF and ANT trimmers for peak meter reading. Maintain S-3 signal level.

m. Set BAND switch to 7.0 and PRESELECTOR to 3.9 on the logging scale. Tune to calibrate signal at 7.1 mc. Maintain S-3 signal level.

n. Adjust B OSC, RF, and ANT trimmers for peak S-meter reading. Adjust OSC trimmer first.

o. Disconnect the crystal calibrator output attenuator. This completes r-f alignment.

p. If signal generator and r-f vtm are used for this alignment, connect the generator output to the receiver ANT jack. Set generator output to frequencies listed, and align RF and ANT trimmers as outlined in preceding steps. Connect r-f vtm to XTAL OSC OUTPUT jack on bottom side of chassis, leaving load plug P1 in place. Align OSC trimmers as indicated except adjust for peak reading on the vtm. In step k, adjust PRESELECTOR near 6.6 on logging scale at the point where vtm reading peaks.

#### 4.5.4 VFO SIDEBAND FREQUENCY SHIFT ADJUSTMENT.

Set EMISSION switch to LSB, and tune to zero beat with calibrate signal at 3.7 mc. Without further movement of the dial, switch to USB, and adjust C308 (on vfo) for zero beat.

#### 4.5.5 CRYSTAL CALIBRATOR ADJUSTMENT.

a. Set receiver for AM reception, and tune to WWV at 15.0-mc at a time when the station is not transmitting tone.

b. Turn function switch to CAL position. Set 100 KC ADJUST trimmer C61 for zero beat of the calibrate signal against WWV.

#### 4.5.6 VFO DIAL CALIBRATION.

Calibrate the dial at 100. If zero beat with the calibrate signal does not occur at 0 and 200 +1 kc on the dial, there is end-point spread. If there is no end-point spread, but the hairline is not vertical when the dial is calibrated, a mechanical adjustment only is required. Refer to step h in the following procedure. To correct for end-point spread, make the following adjustments:

a. Set BAND switch to any band and function switch to CAL, and tune calibrate signal to zero beat at 200 end of the dial.

b. Set hairline to 200 with zero set knob.

c. Tune calibrate signal to zero beat at 0 end of the dial. Note the difference in kilocycles between the hairline and dial 0 (example: -1.5 kc).

d. Without moving the hairline, move the dial to the opposite side of 0 by an amount equal to the frequency difference noted above (example: +1.5 kc).

e. Adjust L302 for zero beat. It is located on top of the vfo can.

f. Set the hairline at 0 with zero set knob.

g. Tune the calibrate signal to zero beat at the 200-end of the dial. If zero beat does not occur at exactly 200, repeat steps b through e.



## SECTION 4

### Service Instructions

h. After adjustment of end points, if the hairline is not vertical in the dial window, loosen the set-screws on the dial hub, and move the dial relative to the oscillator shaft so that, at zero beat, the dials reads 0 to 200 with the hairline vertical.

i. After these adjustments of the vfo calibration, make the vfo sideband frequency shift adjustment as outlined in paragraph 4.5.4.

#### 4.5.7 TUNABLE BFO ALIGNMENT.

a. Make sure the BFO tuning knob is correctly positioned on the shaft. At the control end stops, the knob pointer should be at approximately 7 o'clock (ccw end) and 5 o'clock (cw end).

b. Rotate BFO knob to extreme counterclockwise.

c. Turn on calibrator and tune receiver to zero beat in USB position.

d. Turn on tunable bfo, and set BFO knob to 0.

e. Adjust L10 for zero beat.

#### 4.5.8 NOTCH FILTER ALIGNMENT.

a. Check REJECTION TUNING knob position. Pointer should be at OFF when the knob is at the counterclockwise stop. Leave at OFF position.

b. Tune to the calibrate signal on a band which provides a calibrate signal level of approximately S-9 plus

20 db in either USB or LSB position. Center signal in filter passband (approximately 1350-cps tone).

c. Set REJECTION TUNING knob to midscale (pointer vertical).

d. Alternately adjust L8 and R77 for maximum depth of notch as indicated by minimum S-meter reading. If the Q-multiplier exhibits a tendency to ring or oscillate, back off slightly on R77.

#### 4.5.9 I-F GAIN ADJUSTMENT.

To set i-f gain control R57, a signal generator with a calibrated output attenuator is required. Connect the signal generator to the receiver ANT jack, and adjust to 1.5 microvolts output at 28.6 mc. Tune the receiver to the generator signal, and adjust R57 to the point which produces a just-perceptible increase above the no-signal reading on the S-meter. Do not make this adjustment until receiver alignment has been completed.

#### 4.5.10 S-METER ZERO ADJUSTMENT.

a. Set receiver to the middle of any operating band, and peak PRESELECTOR for maximum output.

b. Set RF GAIN to maximum, and short ANT jack to ground.

c. Set S-METER ADJUST (R13) so S-meter reads zero.

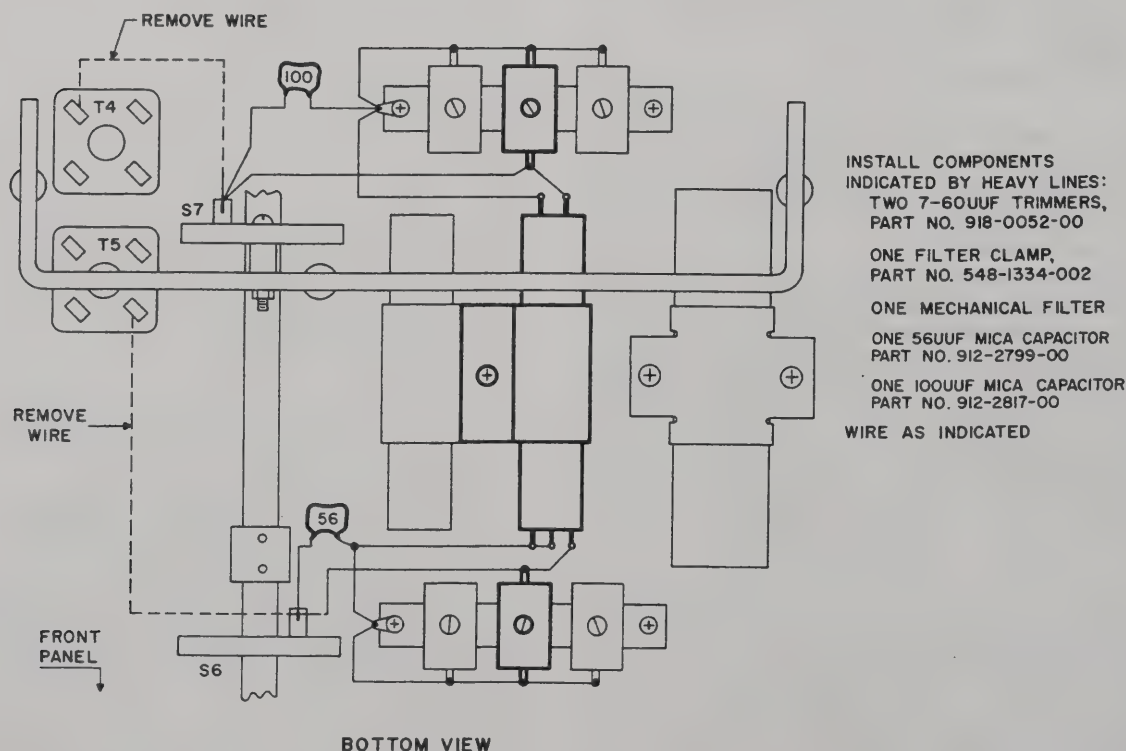


Figure 4-2. Optional Filter Installation Diagram

#### 4.6 Installation of Optional Filters.

Space is provided in the 75S-3/3A to install accessory filters in place of the 455-kc transformers used in the AM function. Figure 4-2 shows the placement of parts and required wiring changes.

To obtain access to the front trimmer-mounting strip, remove the long strip located behind the front panel and fastened by machine screws to the brackets for the front cabinet feet. Bend the mounting tabs on the new trimmer capacitors slightly toward each other, snap the trimmers into place on the trimmer-mounting strips, and solder the appropriate lugs to the ground buses as shown in figure 4-2. Install the filter as shown. If necessary, bend the new filter

clamp slightly to provide a good fit around the filter. One end of the filter has three terminals, one of which has no insulation around it. This is the case ground. Connect this terminal and either one of the two remaining terminals to chassis ground. Either of the terminals on the opposite end of the filter may be used for the ground connection indicated. Dress the new wiring carefully to prevent shorts. Where needed, use spaghetti from removed wiring.

When installation and wiring are completed, turn the receiver on, and tune to the calibrate signal at 14.0 mc. Adjust the filter trimmer capacitors for maximum S-meter reading with the signal centered in the filter passband. Available filters and installation kit of parts are listed in table 5-2.





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section **1**

## installation

**1.1 Unpacking.**

Lift the receiver out of the carton and packing material. Examine for visible damage. If the receiver has been damaged in shipment, save the box and packing material, and notify the transportation company. Complete and mail the equipment registration card. Check tubes and crystals for proper seating in sockets. Check tuning controls and switches for freedom of action. Check that the special Mu-Metal shields are in place on tube V11 and coil L10 (see figure 4-1). Check the equipment included with the receiver against table 1-1.

**1.2 Cabling.**

1.2.1 EXTERNAL CONNECTIONS. Figure 1-1 shows the location of jacks for external connections to 75S-3 and 75S-3A receivers. The power cable plugs into socket J13. The ANT jack is a nominal 50-ohm antenna input. The 4  $\Omega$  AUDIO jack is for connection of a speaker.

**CAUTION**

DO NOT connect the a-c power cord to the 115-volt a-c line until power plug P6 has been plugged into J13. To avoid damage to the receiver, make sure the key on P6 is properly aligned with the keyway on J13.

To connect the receiver for mute operation, a means of supplying a ground while receiving must be applied to the MUTE jack. Opening this circuit mutes the receiver. A set of normally closed contacts on a relay which is keyed with the transmitter may be used for this purpose. To use this circuit, the receiver must be operated in the STBY position.

The CW SIDETONE jack is a high-impedance, low-level audio input (0.2 volt rms, typical) to the receiver. Audio from a sidetone oscillator may be applied to this

TABLE 1-1. EQUIPMENT FURNISHED WITH 75S-3/3A

QUANTITY	DESCRIPTION	FUNCTION	PART NUMBER
2	Phono-type connectors	External connections	361-0062-00
1	Fuse, 2-ampere	Spare	264-4070-00
1	Power cord	A-c power	544-3121-00
1	Power plug adapter	A-c power	368-0138-00
1	Instruction book	75S-3/3A instructions	523-0148-00
1	Logbook	Station logging	523-0755-820
1	Cable marker card	Cable identification	280-2946-00
1	No. 4 Bristo wrench	Accessory tool	024-2900-00
1	No. 6 Bristo wrench	Accessory tool	024-9730-00
1	No. 8 Bristo wrench	Accessory tool	024-0019-00
1	No. 10 Bristo wrench	Accessory tool	024-9710-00



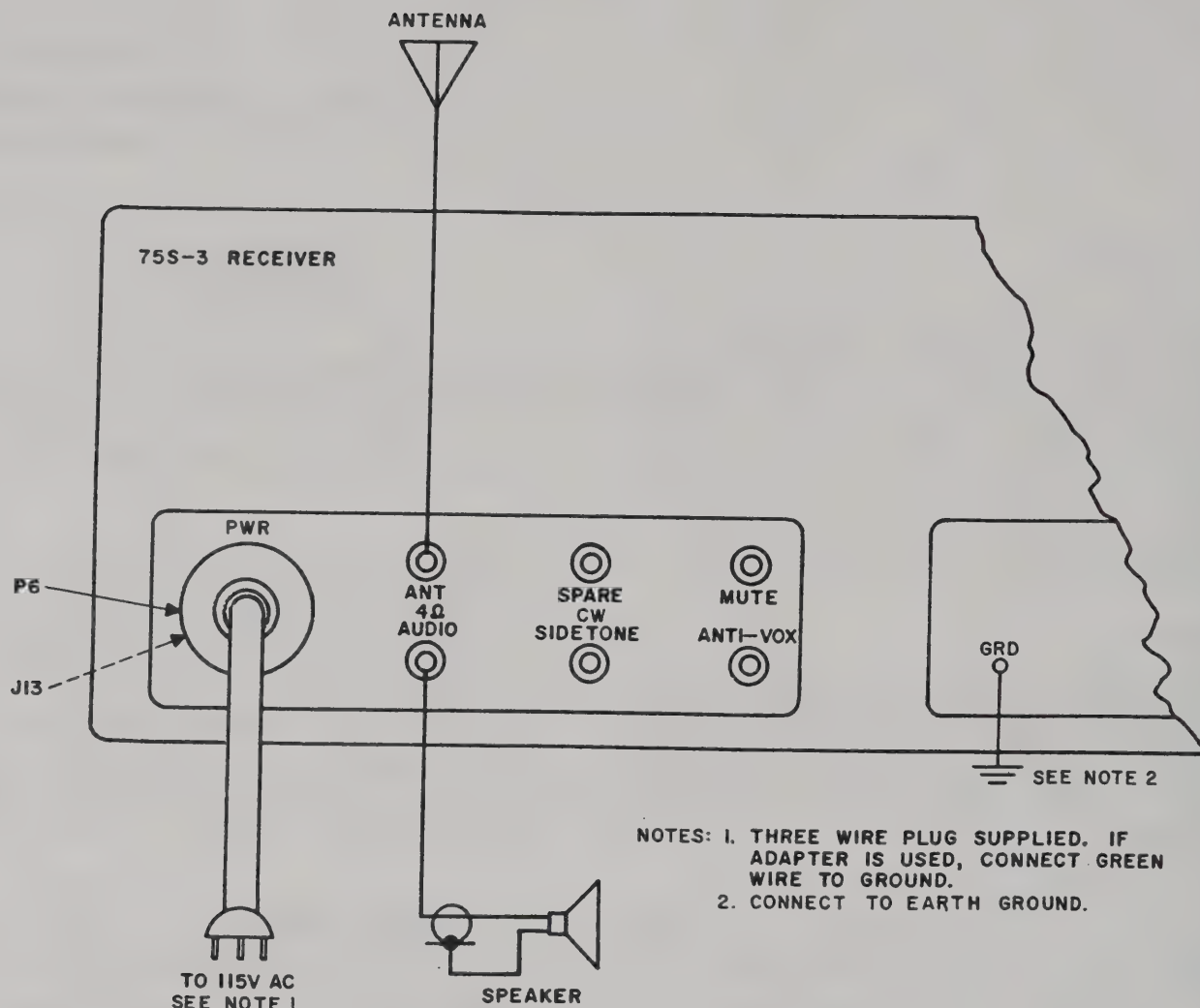


Figure 1-1. External Connections

jack to provide a cw monitoring circuit through the receiver audio system.

The ANTI-VOX jack is a 500-ohm audio output from the receiver. At normal speaker volume levels, 5 to 10 volts rms is provided at this output. This voltage is normally applied to anti-vox circuits in an associated transmitter.

The PHONES jack on the front panel is connected through a resistive network to a 500-ohm tap on the output transformer. Therefore, best results will be obtained if headphones used are 500 ohms or higher impedance. The speaker is silenced when headphones are plugged in.

1.2.2 CABLING WITH 32S-3 TRANSMITTER. Figure 1-2 shows a complete station interconnection for a 75S-3 or 75S-3A Receiver, 32S-3 Transmitter, and

312B-4 Station Control. The RG-58C/U cables indicated are slightly larger in diameter and two inches shorter than the audio and control cables. If the 312B-4 is not used, connect a 4-ohm speaker, such as the 312B-3, to 4 Ω AUDIO jack on receiver. Connect ANTI-VOX jack on receiver directly to ANTI-VOX jack on transmitter. Omit PHONE PATCH and PTT connections.

To connect the 75S-3 or 75S-3A and the 32S-3 for transceiver operation, use the patch cables furnished with the transmitter, and connect as follows:

- Connect the 32S-3 and 75S-3/3A as shown in figure 1-2.
- Remove P1 from XMTR XTAL OSC jack J7 (under 32S-3 top cover), and plug it into 32S-3 RCVR XTAL OSC jack J6. Remove the 100-ohm dummy load plug from the 75S XTAL OSC OUTPUT jack, and plug it into 32S-3 XMTR XTAL OSC jack J7.

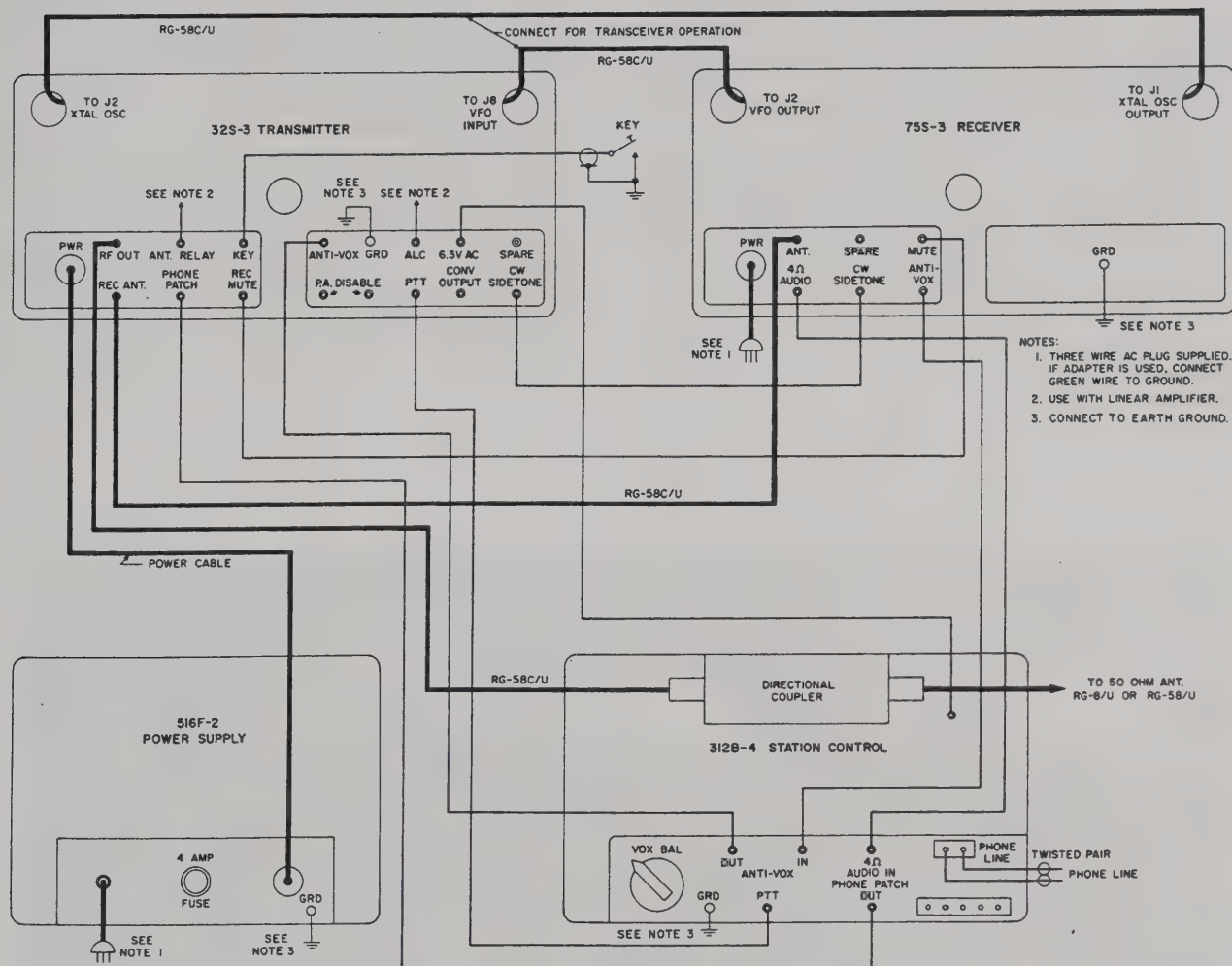


Figure 1-2. Station Interconnections

## SECTION 1

### Installation

**1.2.3 CABLING WITH KWM-2/2A TRANSCEIVER.**  
The 75S-3/3A may be used with a KWM-2/2A to provide separate transmit and receive frequencies. Connect the patch cables as follows:

- a. Using an RG-58C/U patch cable, connect REC ANT jack on KWM-2/2A to ANT jack on 75S-3/3A.
- b. Connect the 500  $\Omega$  jack on the KWM-2/2A to the ANTI-VOX jack on the 75S-3/3A. If a 312B-4 or 312B-5 is used, connect the KWM-2/2A 500  $\Omega$  jack to ANTI-VOX IN and the 75S-3/3A ANTI-VOX jack to ANTI-VOX OUT on the 312B-4/5.
- c. Connect the REC MUTE jack J20 on the KWM-2/2A to the MUTE jack on the 75S-3/3A.

The station speaker may be plugged into either the 4  $\Omega$  jack on the KWM-2/2A or the 4  $\Omega$  AUDIO jack on the 75S-3/3A. For normal mute operation, set the 75S-3/3A function switch to STBY. Receiver output from the KWM-2/2A is turned off by setting AF GAIN to zero. For transmit and receive operation on the same frequency, reduce the 75S-3/3A AF GAIN to zero, and operate the KWM-2/2A in a normal manner.

### 1.2.4 CABLING WITH OTHER TRANSMITTERS.

- a. To provide receiver muting when using 75S-3/3A with KWS-1, connect a cable from pins 5,6 on J102 (receiver disable) in the transmitter to MUTE jack on the receiver. Connect a cable from receiver ANTI-VOX jack to pin 7 on J102 (500-ohm audio) in the KWS-1. Connect cable shield to ground.
- b. To use the 75S-3/3A with the 32V-3, connect a cable from the receiver MUTE jack to receiver disabling pins 24 and 25 on the transmitter.
- c. To use the 75S-3/3A with other makes of transmitters, connect muting, cw sidetone, and anti-vox provisions in the receiver as applicable. The requirements for use are outlined in paragraph 1.2.1.

### 1.3 Initial Checks.

Lift the top cover, and make sure the dummy load (see figure 4-1) is plugged into the XTAL OSC OUTPUT jack unless the receiver is connected for transceiver operation. Recheck the interconnections to make sure the patch cables are plugged into the appropriate jacks. Be sure that RG-58C/U cables, rather than the audio and control cables, have been used for all r-f applications. Check to ensure the special Mu-Metal shields are in place on tube V11 and coil L10.



# section 2

## operation

### 2.1 Calibration.

- After making external connections, set controls as shown in figure 2-1.
- Set BAND switch (11) to desired frequency range. If receiver is 75S-3A, set crystal board selector (10) so desired set of bands appears in window.
- Set dial to 0, 100, or 200 with tuning knob (3).
- Adjust PRESELECTOR (2) for maximum signal or noise output.
- Tune back and forth near 0, 100, or 200 until calibrate signal is at zero beat.
- Adjust zero set knob (4) until dial is calibrated.

### 2.2 Single-Sideband Tuning.

- Set controls as shown in figure 2-1, except set function switch (1) to OPR, and the BFO knob fully counterclockwise until a click is heard.
- Set EMISSION switch (12) to desired sideband.
- Adjust PRESELECTOR (2) for maximum signal or noise output.
- Tune in signal and adjust AF GAIN (9) for desired audio output level.

When listening to strong signals, a reduction in background noise under no-modulation conditions may be

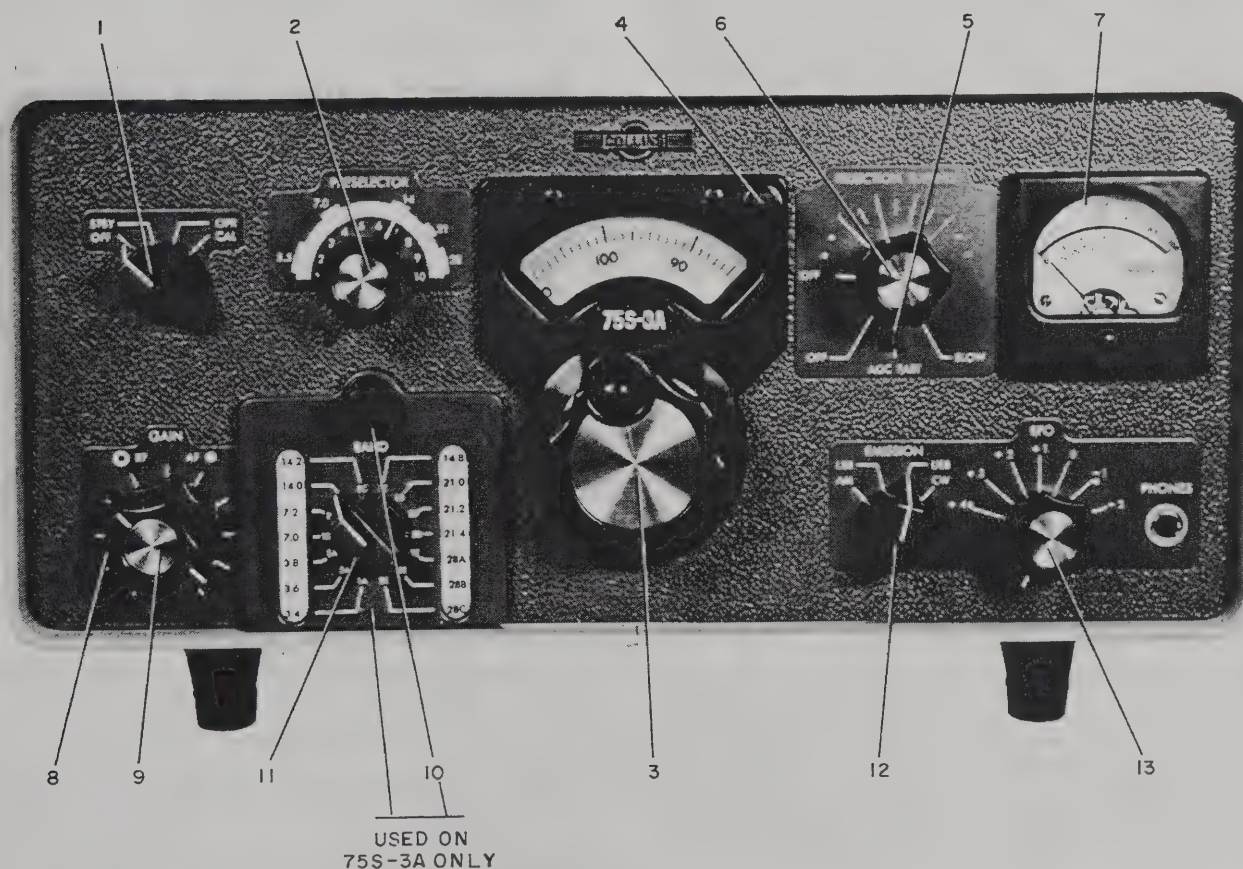


Figure 2-1. Operating Controls

## SECTION 2

### Operation

obtained by rotating RF GAIN control (8) counterclockwise, away from the maximum position. As this is done, S-meter (7) static reading will shift up scale. At proper gain control setting, meter will kick about one or two S-units on peaks. For example, if the weakest of the desired signals is peaking at S-9, set gain control so that static meter reading is S-7 to S-8. This retains accurate meter readings.

To read frequency, add the dial setting to the BAND switch setting. For example, if the BAND switch is set to 3.8 and the dial is set to 5, the frequency is 3.805 mc. If the BAND switch is set to 3.8 and the dial to 170, the frequency is 3.970 mc.

#### 2.3 CW Tuning.

- Set controls as outlined in paragraph 2.2 except set EMISSION switch to CW.
- Rotate the BFO knob (13) clockwise to energize the tunable bfo. Set to either +1 or -1.
- Adjust BFO knob to yield the most pleasing beat note with the desired signal centered in the filter pass band.
- Read approximate frequency as follows: When BFO knob is set to the plus side of zero, add kilocycle reading from bfo scale to dial reading. Subtract bfo reading for minus settings of the knob. If a precision reading is desired, set the BFO knob, and recalibrate the main tuning dial using the crystal calibrator. When the main dial is calibrated in this manner, further adjustment of the BFO knob or switching to the crystal-controlled BFO requires recalibration of the dial.

Either fast or slow AGC (5) may be used, or it may be turned off. If AGC is turned off, decrease RF GAIN control setting to prevent receiver overloading. Adjust AF GAIN control to provide desired audio level. In general, it is best to set r-f gain at a point just below that which causes signal to overload receiver. This provides optimum sensitivity.

Tuning may be facilitated by switching first to USB to tune in the desired signal and then switching to CW to reduce interference. The beat note will be the same in either position. The wider pass band provided in USB is also useful for net operation.

#### 2.4 AM Tuning.

- Set controls as outlined in paragraph 2.2.
- Set EMISSION switch to AM.
- Set AGC switch to FAST.
- Tune in signal, and adjust AF GAIN for desired audio output level.

If desired, SSB methods may be used for AM reception. Set EMISSION switch to either USB or LSB position; use tuning procedure for a single-sideband signal. Once the desired signal is tuned in, switching to the opposite sideband may yield a more readable signal. This method of reception is useful under conditions of severe interference or extreme fading.

#### 2.5 RTTY Tuning.

This type of operation requires an external RTTY converter and printer. Tune receiver as follows:

- Set controls for SSB reception as outlined in paragraph 2.2 with EMISSION switch in USB position.
- Turn on tunable bfo by rotating BFO knob (13) clockwise.
- Set the pointer on the BFO tuning knob at the dot near -1 on the calibrated scale.
- Tune the receiver for maximum S-meter reading on the desired RTTY signal.
- Fine adjustment of the BFO tuning knob then will produce 2125 cps and 2975 cps mark and space signals at the receiver audio output. To reverse the mark and space signals, reset the BFO tuning knob to the dot near +4 on the calibrated scale.

#### 2.6 Rejection Tuning.

An interfering heterodyne or cw signal may be reduced in level or eliminated by operation of the REJECTION TUNING knob (6). The off position for this control is at the end of extreme counterclockwise rotation. The on-off switch is provided with a positive stop rather than a detent. Do not force the knob. Clockwise rotation of the knob from the off position moves the rejection notch across the receiver pass band. It is recommended that the operator familiarize himself with the operation of this control by tuning the notch across the signal from the crystal calibrator.

When the receiver is initially placed in operation, it may be necessary to touch up the adjustment of R77. Refer to paragraph 4.5.8.

#### 2.7 Use of S-Meter.

The S-meter is intended primarily to indicate relative rather than absolute signal strength. A nominal meter reading of S-9 is obtained with an input signal of 100 microvolts. The threshold of agc operation is set at the factory to a nominal value of 1.5 microvolts. Due to normal tolerances in receiver operation, agc threshold varies slightly from band to band causing correspondingly slight changes in the number of db represented by each S-unit. The db scale is calibrated with 1 microvolt as a reference; therefore, an S-9 signal of 100 microvolts represents a 40-db increase over the reference signal level. Since agc is not applied to very weak signals, S-zero is arbitrarily established at 10 db on the scale. Typical meter readings, therefore, can represent from 3.3 to slightly over 4 db per S-unit. A figure of 4 db can be taken as an average.

#### 2.8 Transceiver Operation with 32S-3 Transmitter.

- Make sure patch cables are connected as outlined in paragraph 1.2.2.
- Set FREQ CONTROL (1) on 32S-3 to REC VFO position.
- Set OFF-STBY-OPR-CAL switch on 75S-3/3A to STBY position.
- Set both BAND selectors to the same desired band and both EMISSION switches to the same position (either USB, LSB or CW).
- Tune both receiver and transmitter as in normal operation. Both transmit and receive functions operate from the receiver vfo; the transmitter vfo is not used



in transceiver operation. Switching the transmitter **FREQ CONTROL (1)** back to **TRANS VFO** position will allow separate operation of the two units within the same 200-kc band.

## NOTE

In CW transceiver operation, the 75S variable bfo will have to be used to obtain the desired beat note if it is desired to transmit zero beat with another station.

**CAUTION**

When operating in transceiver service, do not operate the transmitter while the receiver is tuned outside band limits; the transmitted signal will be out of the band. Do not attempt operation with receiver and transmitter set on different 200-kc bands, even when operating in **TRANS VFO** position. With patch cables connected for transceiver operation, the receiver h-f crystal oscillator controls injection frequency to the transmitter second mixer.

If operation on different 200-kc bands is desired (that is, receive on one 200-kc band and transmit on another), remove the transceiver patch cables and operate the units as in normal independent operation.

If transmitted frequency is changed by any great amount, be sure to redip the PA plate current and check the loading. This will be most important on the 80- and 40-meter bands.

Some operating experience will indicate the amount of frequency excursion possible without readjustment.

Do not attempt operation in transceiver service with any other receiver not having the same frequency mixing scheme.

f. To restore both units to normal operation, remove the two patch cables connecting oscillator signals, replace P1 in J7 on the transmitter slug rack (under top cover), and replace the 100-ohm load plug in the receiver XTAL OSC OUTPUT jack.

**2.9 Operation Outside Amateur Bands.**

Additional 10-meter band coverage, or coverage outside the amateur bands may be obtained by plugging an appropriate crystal into the crystal mounting board. Two extra sockets are provided in the mounting board for this purpose. The total 3.4- to 30.0-megacycle coverage available is divided into five segments, designated A, B, C, D, and E. The frequency range of each of these segments is listed in the total coverage column of table 2-1. The letter portions of the crystal socket locations shown in figure 2-2 indicate which sockets may be used for crystals to cover a 200-kc band within a specific total coverage segment. For example, crystals for extended 10-meter coverage must be plugged into sockets marked E.

The proper crystal for coverage of a specific 200-kc band may be selected as follows:

a. If the lower edge of the desired band is 11.8 mc or less, the required crystal frequency is equal to the

TABLE 2-1. CRYSTAL FREQUENCIES AND OPERATING BANDS

BAND-SWITCH POSITION	FREQUENCY BAND	CRYSTAL SUPPLIED	CRYSTAL SOCKET CONNECTED	TOTAL COVERAGE
1A - 3.4 2A - 3.6 3A - 3.8	3.4 - 3.6 mc 3.6 - 3.8 mc 3.8 - 4.0 mc	6.555 mc 6.755 mc 6.955 mc	1A 2A 3A	A 3.4 - 5.0 mc
1B - 7.0 2B - 7.2	7.0 - 7.2 mc 7.2 - 7.4 mc	10.155 mc 10.355 mc	1B 2B	B 6.5 - 9.5 mc
1C - 14.0 2C - 14.2 3C - 14.8	14.0 - 14.2 mc 14.2 - 14.4 mc 14.8 - 15.0 mc	8.5775 mc 8.6775 mc 8.9775 mc	1C 2C 3C	C 9.5 - 15.0 mc
1D - 21.0 2D - 21.2 3D - 21.4	21.0 - 21.2 mc 21.2 - 21.4 mc 21.4 - 21.6 mc	12.0775 mc 12.1775 mc 12.2775 mc	1D 2D 3D	D 15.0 - 22.0 mc
1E - 28A 2E - 28B 3E - 28C	28.5 - 28.7 mc As selected As selected	15.8275 mc Not supplied Not supplied	2E 2E 3E	E 22.0 - 30.0 mc



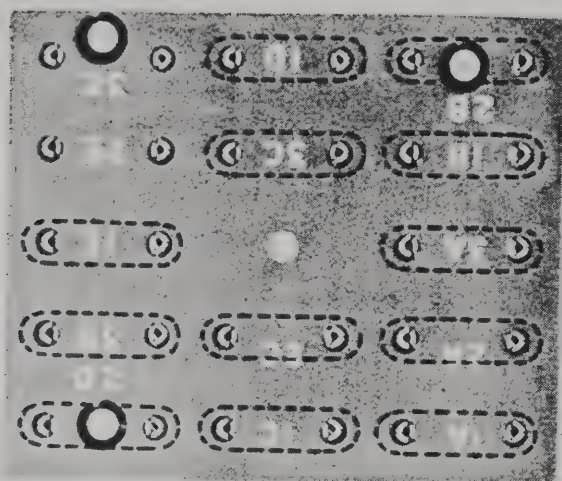


Figure 2-2. Crystal Socket Locations

lower edge of the desired band plus 3.155 mc. For example, if the desired band is 4.0 to 4.2 mc, the required crystal frequency is 7.155 mc.

b. If the lower edge of the desired band is 12.0 mc or higher, the required crystal frequency is equal to half the sum of the desired lower band edge and 3.155 mc. For example, if the desired band is 14.4 or 14.6 mc, the required crystal frequency is 8.7775 mc.

Extra crystals available are listed in section 6, Parts List.

Approximate settings for the PRESELECTION are shown in figure 2-3. For example, if coverage from 10.0 to 10.2 mc is desired, plug the appropriate crystal into a socket marked C, turn the BAND switch to that position, and set the PRESELECTOR to approximately 3.2 on the logging scale. Peak the PRESELECTOR tuning as in normal operation. The ANT, RF, and OSC trimmer capacitors (those marked C in the example above) may also be peaked if optimum performance is desired at frequencies outside the amateur bands. On some bands it is possible to peak the PRESELECTOR tuning at an image frequency or at a different order of output frequency from the crystal oscillator; however, there is only one correct setting for coverage within a given 200-kc band.

The above information also applies to the 75S-3A except that two crystal mounting boards are provided in this receiver. The amateur-band board is located under the chassis. To obtain access, refer to paragraph 4.1. When crystal board selector (10) is switched to extended coverage position, the above-chassis board is switched into the circuit. The crystal socket locations are the same for both boards. Space is provided in the window adjacent to the BAND switch to mark in-band information. A pencil may be used to allow erasure if changes are made.

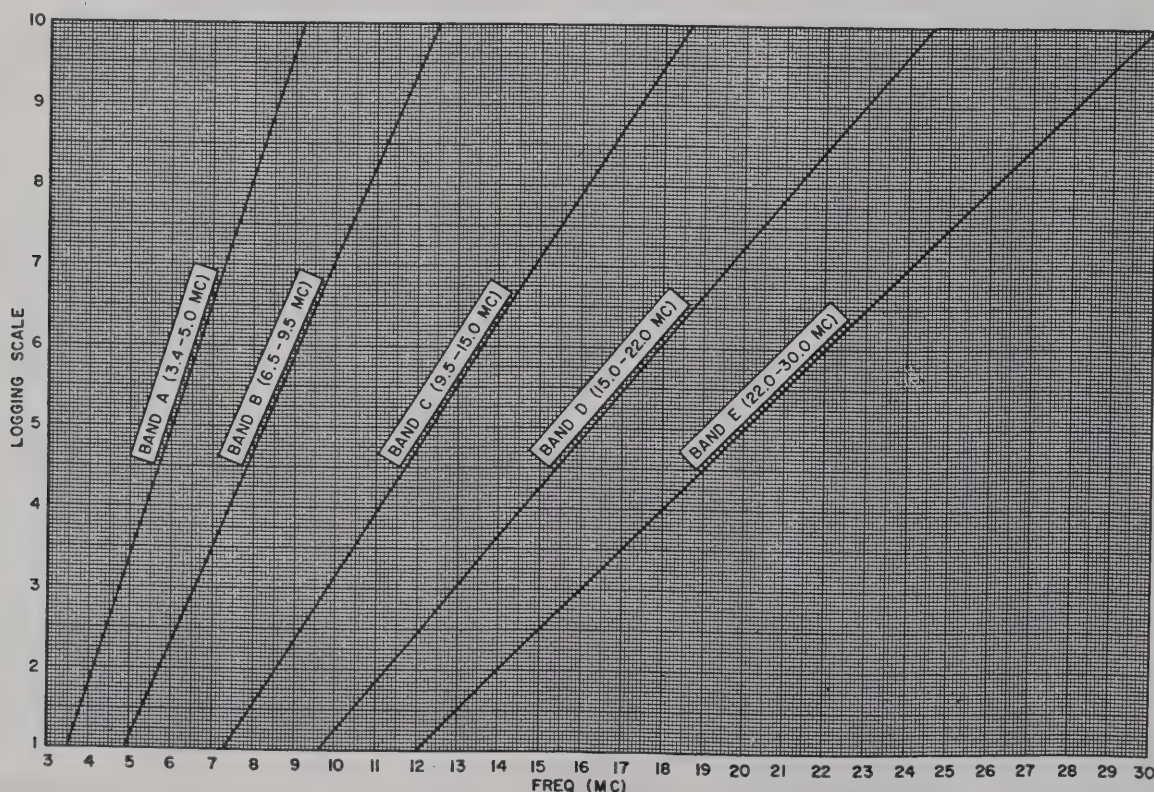


Figure 2-3. Preselector Calibration Curves



## principles of operation

### 3.1 Block Diagram.

Figure 3-1 is a block diagram for 75S-3 and 75S-3A Receivers. Double conversion is used, with injection voltage for the first conversion provided by a crystal-controlled oscillator. A band-pass i-f, 200 kilocycles wide, is used to couple the first and second mixers. Injection voltage for the second mixer is furnished by a vfo with a tuning range of 200 kc. The 455-kc output frequency of the second mixer is coupled through the i-f system to separate AM and SSB detectors. Injection voltage for the product detector is provided by either a crystal-controlled bfo or a tunable bfo. The 75S-3A is identical to the 75S-3 except that it is equipped with an extra h-f crystal mounting board on the chassis, a crystal board selector switch on the front panel, and associated components. Figure 7-1 is a schematic diagram for both receivers, with circuit differences noted.

### 3.2 R-F and Mixer Circuits.

The r-f amplifier grid, high-frequency mixer grid, and crystal oscillator plate circuits are resonated by slug-tuned coils. The slugs are mechanically ganged and linked to the PRESELECTOR tuning knob. The required tuning ranges of these circuits are obtained by switching appropriate values of fixed capacitance in parallel with the coils. The total 3.4- to 30-mc tuning range of the receiver is divided into five segments for band-switching purposes, as noted in table 2-1. The tuned circuit LC ratio is thereby varied within appropriate limits for each of the five segments.

Signals within the particular 200-kc band selected are amplified by V2, the r-f amplifier, and coupled to the control grid of V3A, the first mixer. Injection voltage is coupled to the cathode of V3A. Products of mixing are selected in the plate circuit of V3A, tuned to 3.155 to 2.955 mc which is the band-pass i-f frequency. Signals are coupled to the control grid of second mixer V4A with vfo injection voltage applied to the cathode of this tube.

### 3.3 Oscillator Circuits.

**3.3.1 CRYSTAL OSCILLATORS.** High-frequency crystal oscillator V3B provides injection voltage for the first mixer. The crystal oscillator output frequency is always 3.155 mc higher than the lower edge of the selected band. On bands below 12.0 mc, the oscillator plate circuit is tuned to the crystal frequency. At 12.0 mc and higher, the plate circuit is tuned to the second harmonic. The secondary winding of T2 couples injection voltage to the first mixer cathode circuit and furnishes a d-c return

to ground for mixer tube V3A. Dummy load R41 stimulates the load presented by the 32S-3 Transmitter when connected for transceiver operation.

Crystal-controlled bfo V8B and associated circuitry furnishes injection voltage for the product detector. Crystals Y15 and Y16 provide the proper bfo frequency relationships to the mechanical filter passband to yield optimum audio response from the product detector. Crystal Y15 is used for lower sideband reception, and Y16 is used for upper sideband. Capacitor C95 and coil L-12 form a broadly resonant circuit at 455 kc. Oscillator voltage is developed across R49 and coupled by C100 to the cathode of V8A, the product detector tube.

The crystal calibrator circuit provides marker signals at multiples of 100 kc. Variable capacitor C61 provides for adjustment to zero beat with WWV. The output of this oscillator is coupled to the receiver antenna circuits.

**3.3.2 VARIABLE OSCILLATORS.** The vfo uses fixed capacitance and variable inductance to produce the required tuning range of 2.5 to 2.7 mc. Capacitor C303, in the frequency-determining network, is paralleled by variable capacitor C308 in series with diode CR301. This diode switches C308 in or out of the circuit, depending upon the polarity of a bias voltage impressed across the diode junction. The bias voltage is coupled to the diode through R303, and is positive in the USB position causing CR301 to switch C308 into the circuit. When C308 is properly adjusted, it shifts the vfo frequency by an amount equal to the frequency separation of crystals Y15 and Y16. This allows either sideband to be selected without retuning or recalibrating the dial. The vfo output voltage is coupled to the cathode of second mixer tube V4A and to the control grid of cathode follower V4B. The cathode follower prevents loading of the vfo circuits by cable capacity when operated in transceiver service.

Tube V11 and associated circuitry comprise a tunable bfo. The bfo tuning control is potentiometer R81. This control varies a positive d-c voltage applied to the junction of voltage-variable capacitor CR4. The junction capacity of this device is proportional to applied voltage. Adjustment of R81 therefore varies the output frequency of the bfo. Voltage for the tuning circuit is stabilized by a regulator consisting of Zener diode CR5 and resistor R82. Switch S13 completes the cathode circuit of either V8B or V11 thus turning on the desired bfo

## SECTION 3

### Principles of Operation

and turning off the other. The output circuits of both oscillators are coupled to the product detector.

#### 3.4 I-F And Detector Circuits.

Output from the second mixer is coupled to either one of two band-pass filters or 455-kc tuned circuits. A mechanical filter with 2.1-kc nominal bandwidth is provided for SSB reception. A band-pass crystal filter with 250 cps nominal bandwidth is selected in the CW position. For AM reception, two cascaded 455-kc transformers provide increased bandwidth. Output from these circuits is coupled through the Q-multiplier to the first i-f amplifier, V6. The cathode of V6 is returned to ground through potentiometer R57 which is used to set the gain of this stage at a point producing the proper agc threshold. The S-meter circuit is connected from the screen circuits of V6 and V7, the two i-f amplifiers, to the cathode of V7. Under no-signal conditions, the voltage developed across R13 is equal to that developed across R17, and the meter reads zero. Application of agc causes the cathode current of V7 and the combined screen current of V6 and V7 to decrease. The voltage across R17 increases, the voltage across R13 decreases, and the meter reads up-scale by an amount which is proportional to signal strength. Output voltage from the second i-f amplifier is coupled to the product detector, V8A. It is also coupled to separate AM and agc diode detectors. Injection voltage is applied to the cathode of the product detector.

#### 3.5 Q-Multiplier And Notch Filter.

The notch filter is composed of coil L8 and associated capacitors and resistors. The rejection notch occurs at the resonant frequency of this circuit and is centered at 455 kc. Capacitor C132 is mechanically coupled to the REJECTION TUNING control which allows the notch frequency to be moved across the receiver i-f passband. Potentiometer R77 is adjusted to provide optimum Q and depth of notch. Switch S10 shorts the filter circuit in the OFF position. The Q-multiplier is a feedback circuit which includes L8. This circuit multiplies the Q of L8 approximately ten times, thereby obtaining a much deeper and narrower rejection notch than would be provided by the filter alone. The notch shape provided by this circuit allows unwanted signals to be rejected with minimum disturbance to desired signals.

#### 3.6 AGC And Control Circuits.

Signal voltage is coupled from the secondary of transformer T6 to one of the diode plates in V9 and rectified. Agc voltage is developed across R24, the diode load resistor, and is applied to the r-f and i-f amplifier stages. Signal voltage is filtered from the agc line by R50 and C49. Generation of agc voltage is delayed until the signal voltage at the diode plate exceeds the cathode bias on V9. Potentiometer R57 in the cathode

of the first i-f amplifier tube is normally adjusted so that agc action is initiated with a receiver input signal of approximately 1.5 microvolts. This point is referred to as agc threshold. Agc time constant is determined by the amount of capacitance placed in parallel with R24. Added capacity in the SLOW position of the AGC selector produces a slower release characteristic.

Manual control of r-f gain is also accomplished through the agc line. A voltage divider circuit, consisting of resistors R33, R55, and RF GAIN control R56, is connected across the negative 65-volt bias line. At the maximum gain setting, this circuit places a one-volt static bias on the agc line to furnish proper operating bias for r-f amplifier V2. At lower control settings, increased bias is provided which reduces the gain. The d-c grid return for the first mixer stage and MUTE jack J11 are connected to the junction of resistors R33 and R58. When the receiver function switch is placed in the STBY position, a ground at J11 causes the receiver to operate in a normal manner. Removal of this ground causes cutoff bias to be applied to the mixer grid and increased bias on the agc line, thus muting the receiver.

#### 3.7 Audio Circuits.

Audio voltage from the appropriate detector is selected by S8A on the EMISSION switch, and is coupled to the AF GAIN control. The CW SIDETONE jack, J10, is also connected to this point. A sidetone audio voltage of approximately 0.2 volt will produce a normal listening level at average gain settings. Audio is amplified in a two-stage amplifier consisting of tubes V8 and V10. Three audio outputs are provided. Jack J8 is a 4-ohm outlet for a speaker. The headphone jack is connected to a resistive divider across the 500-ohm tap on the output transformer. The divider provides a load for V10 when the impedance of headphones used is relatively high. The ANTI-VOX jack, J12, is also connected to the 500-ohm tap. At normal audio gain settings, 5 to 15 volts of audio are available at J12 for use with the anti-vox circuits in an associated transmitter.

#### 3.8 Power Supply Circuits.

The internal power supply furnishes filament, plate, and bias voltages for the receiver. Bias voltage is obtained by rectifying a portion of the a-c voltage appearing from one leg of the high-voltage secondary to ground. The tube filaments and pilot lamps are connected in a way which allows operation from a 6-, 12-, or 24-volt source. Filament, plate, and bias voltages may be furnished by an external source such as a mobile power supply. Figure 7-1 illustrates the proper connections to the power plug for this type of operation.



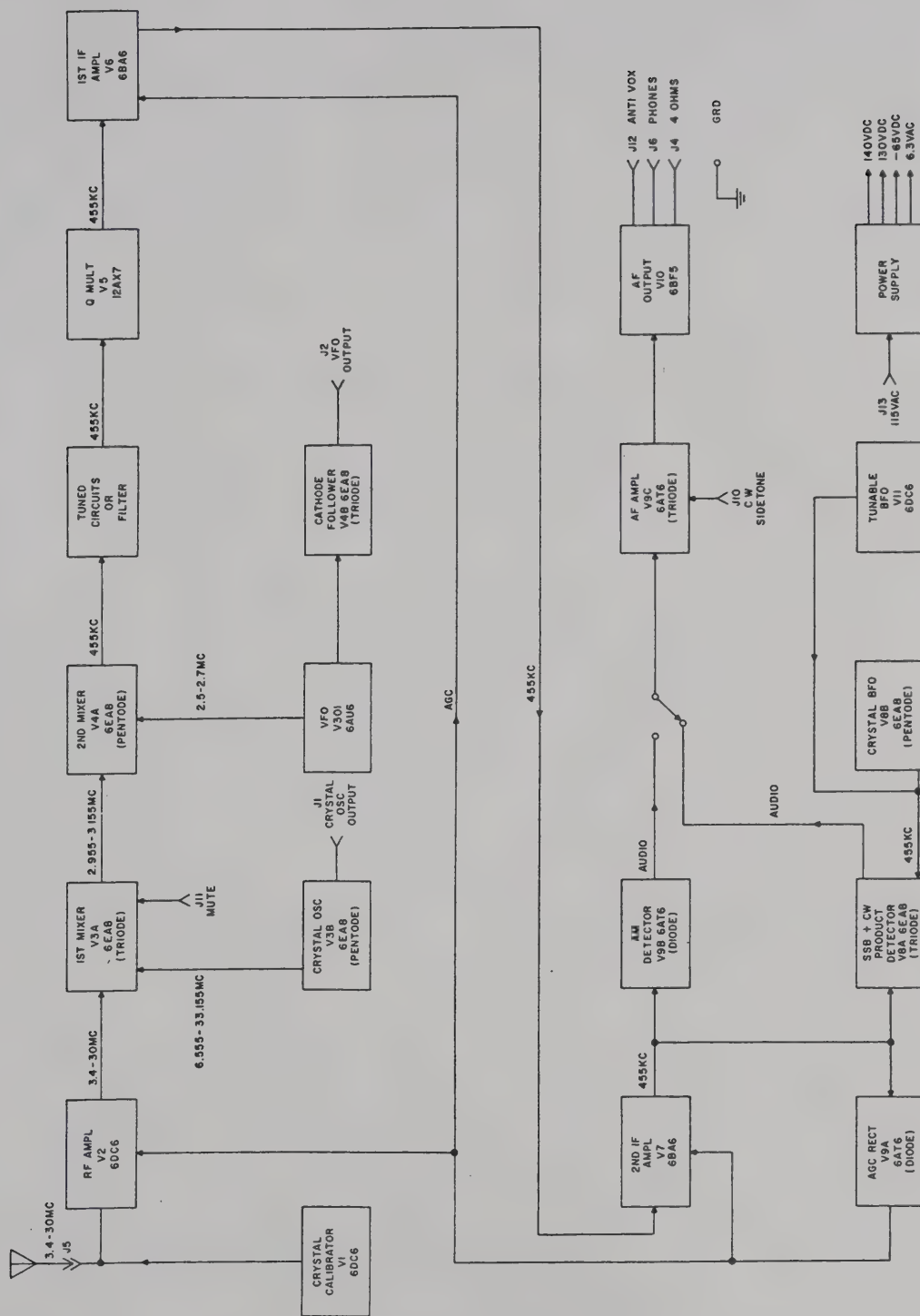


Figure 3-1. Block Diagram



## service instructions

### 4.1 General.

This section covers maintenance and service of 75S-3 and 75S-3A Receivers. It includes information on trouble analysis, signal tracing procedures, voltage and resistance measurements, and alignment procedures. The usefulness of signal level and alignment data given depends upon the accuracy of the test equipment used. Minor adjustments in alignment may be made using the crystal calibrator as a signal source. Except for an occasional touch-up to compensate for possible component aging, alignment normally will be necessary only if frequency-determining components have been replaced. If servicing requires that the cabinet be removed, proceed as follows:

- Disconnect all power and external connections.
- Lift the lid, and remove the two screws located at the front edge of the cabinet.
- Remove the four feet and the screw located midway between the rear feet.
- From the rear, push the receiver chassis forward until the front panel protrudes from the cabinet about an inch.
- Grasping the front panel at the edges, slide the receiver out of the cabinet.

#### NOTE

DO NOT lubricate the 70K-2 vfo shaft bearings or the dial drive system bearings. The vfo shaft bearings are lubricated at the factory with a special grease. Dial bearings are the Oilite type which are self-lubricating.

Tube filaments and pilot lamps are connected in series-parallel arrangements for 12- or 24-volt operation. When making tube or lamp replacements, be sure that rated filament currents are the same as the original units.

### 4.2 Trouble Analysis.

Most cases of trouble can be traced to defective tubes. Many tube checkers can not duplicate the conditions under which the tubes work in the receiver. Substitution of new tubes will sometimes clear an obscure case of tube trouble. Intermittent trouble conditions in tubes can usually be discovered by lightly tapping the envelope. Occasionally, tube pins or socket terminals will become dirty or

corroded causing an intermittent condition. When this situation is suspected, remove the tube and apply a few drops of contact cleaner to the tube pins. Replace the tube, and work it up and down in the socket a few times. Shorted tubes or capacitors will often cause associated resistors to overheat and crack, blister, or discolor. Making the measurements listed in table 4-1 will help to isolate this type of trouble to a particular stage or component.

A logical process of elimination in conjunction with a study of the main schematic diagram, block diagram, and section 3 will aid in isolating trouble. For example, if the receiver functions properly in the AM position but fails to operate in the SSB or CW positions, trouble in the product detector should be suspected because this circuit is not used for AM reception. As a further check, both beat-frequency oscillators should be alternately switched into the circuit to see if one has failed. A third possibility would be that both beat oscillators have failed.

If the receiver is to be returned to the factory or an authorized service agency, a detailed report of operational difficulties will assist the servicing agency in making repairs with a minimum of time and expense. This is particularly important when intermittent trouble is involved.

### 4.3 Voltage And Resistance Measurements.

Table 4-1 lists typical voltage and resistance readings at each tube socket terminal except those of the vfo tube, V301. Do not open the vfo can. Make all measurements under the following conditions:

- Unless otherwise noted in the table, set RF GAIN at maximum, AF GAIN at minimum, EMISSION switch in USB position, function switch in OPR position, tunable bfo off, REJECTION TUNING OFF, and AGC in the FAST position.
- Voltage measurements are made with power connected.
- Resistance measurements are made with all external cables, including power cable, disconnected. Resistances of less than one ohm are listed as zero.
- Make all measurements from indicated socket terminal to chassis ground.

It is recommended that a vtm be used for these measurements. A vom may be used if it has an input resistance of not less than 20,000 ohms per volt. Voltage measurements made with a vom will yield lower readings in high impedance circuits such as the agc line. Do not use a vom for r-f measurements.



SECTION 4  
Service Instructions

TABLE 4-1. VOLTAGE AND RESISTANCE MEASUREMENTS

TUBE	TUBE SOCKET TERMINAL								
	1	2	3	4	5	6	7	8	9
V1 CAL ON DCV CAL OFF DCV ACV OHMS	-52 0  1 MEG	+0.7 52  1000*	  0 0	  6.3 0	105 142  230K**	51 142  220K**	0 0  0		
V2 DCV ACV OHMS	-0.8  6 MEG	0  0	 0 0	 6.3 0	138  18K** ①	72  60K**	0  0		
V3 DCV ACV OHMS	112  18K** ①	-11  100K	130  17K** ①	 0 0	 6.3 0	130  17K** ①	0  0	3.6  1000	0  230K
V4 DCV ACV OHMS	120  18K** ①	0  82	120  18K** ①	 6.3 0	 0 0	120  19K** ①	4.4  1000	5.4  680	2.7  100K
V5 DCV ACV OHMS	138  18K** ①	-0  100K	1.1  680	 0 0	 0 0	143  18K** ①	0  340K	1.1  680	6.3  0
V6 DCV ACV OHMS	-0.8  3.7 MEG	0  0	 0 0	 6.3 0	138  0	74  19K** ①	2.2  22K ①		
V7 DCV ACV OHMS	-0.8  3.6 MEG	0  0	 0 0	 6.3 0	138  19K** ①	72  23K** ①	0.62  85		
V8 DCV ACV OHMS	46  120K**	-3.2  1 MEG	48  240K**	 6.3 0	 0 0	112  20K** ①	0  0 ②	0  5	-2.7  5600
V9 DCV ACV OHMS	1.1  680K	2.7  12K	 6.3 0	 0 0	-0.9  3.5 MEG	0 CW, SB 23 AM ∞ CW, SB 220K AM	100  120K**		
V10 DCV ACV OHMS	-11  250K	0  0	 6.3 0	 0 0	127  18K** ①	122  18K** ①	-11  250K		
V11 ON DCV OFF DCV ACV OHMS	-2 0  47K	0 25  0 ③	  6.3 0	  0 0	128 128  20K** ①	30 128  38K**	0 0  0		

\*FUNCTION switch in CAL position

\*\*Resistance may vary depending upon diode and electrolytic condition

① Reverse VOM leads and take highest of the two readings

② Tunable BFO switch OFF

③ Tunable BFO switch ON

TABLE 4-2. SIGNAL LEVELS

SIGNAL INJECTION POINT	GENERATOR OUTPUT FREQUENCY	GENERATOR OUTPUT VOLTAGE	NORMAL INDICATION
V10 - pin 1	1000 cps	5.4 volts	1-watt audio output
V9 - pin 1	1000 cps	0.2 volt	1-watt audio output
V8 - pin 9	455 kc	75 millivolts	1-watt audio output
V8 - pin 6	BFO INJECTION		1.65 volts r-f (each bfo)
V7 - pin 1	455 kc	48 millivolts	Agc threshold
V6 - pin 1	455 kc	175 microvolts	Agc threshold
V4 - pin 6	455 kc	1400 microvolts	Agc threshold
V4 - pin 7	VFO INJECTION		2.0-2.5 r-f volts
V4 - pin 2	3.055 mc	100 microvolts	Agc threshold
V3 - pin 8	HF OSC INJECTION		0.8-2.0 r-f volts
V3 - pin 9	14.1 mc	30 microvolts	Agc threshold
V2 - pin 1	14.1 mc	9 microvolts	Agc threshold
J5 (ANT)	14.1 mc	1.5 microvolts	Agc threshold

#### 4.4 Signal Tracing.

Appropriate test points and normal signal levels are listed in table 4-2. The values listed are nominal. Signal levels in a given receiver may differ from those listed by a factor of plus or minus 20 percent without noticeable degradation in performance. A signal generator with an accurately calibrated output attenuator must be used to provide the r-f signal source voltages indicated. A Hewlett-Packard model 606A or equivalent generator is recommended for this purpose. Be sure to consult the signal generator instruction book for information regarding output termination requirements. Measurements of oscillator injection voltages require the use of an r-f vtm such as the Hewlett-Packard model 410B. Make r-f and audio measurements under the following conditions:

- For audio measurements, use an audio oscillator as the signal source and an a-c vtm or calibrated oscilloscope to monitor receiver audio output. If desired, an audio wattmeter may be used. Set AF GAIN at maximum, and terminate the 4 $\Omega$  AUDIO output with a four-ohm resistive load.
- Oscillator injection voltages are measured with an r-f vtm. Measure from cathode to chassis ground at the associated mixer or product detector tube.

- To check r-f signal levels, connect a d-c vtm to the receiver agc line. Set RF GAIN at maximum. Static d-c voltage on the agc line should be approximately -1.0 volt. Connect the r-f signal generator to the point indicated in the table, and rock the generator dial to produce maximum agc voltage. Starting from minimum output, increase signal generator output to the point where a further increase in signal produces a slight increase in agc voltage. This is agc threshold. Note generator output voltage, and compare with the value listed in the table.

#### 4.5 Alignment Procedure.

Complete alignment of the receiver may be accomplished using the crystal calibrator as a signal source and the S-meter as a peak indicator. To provide a variable output attenuator for the calibrator, connect a .001-uf capacitor to one end of a 5000-ohm carbon potentiometer. Temporarily connect the free end of the capacitor to tube socket terminal 5 of V1, the crystal calibrator. Connect the rotating contact of the potentiometer to ground. Figure 4-1 shows the location of adjustments except for the filter input and output trimmer capacitors. These trimmers are located under the chassis adjacent to the mechanical and crystal filters. The

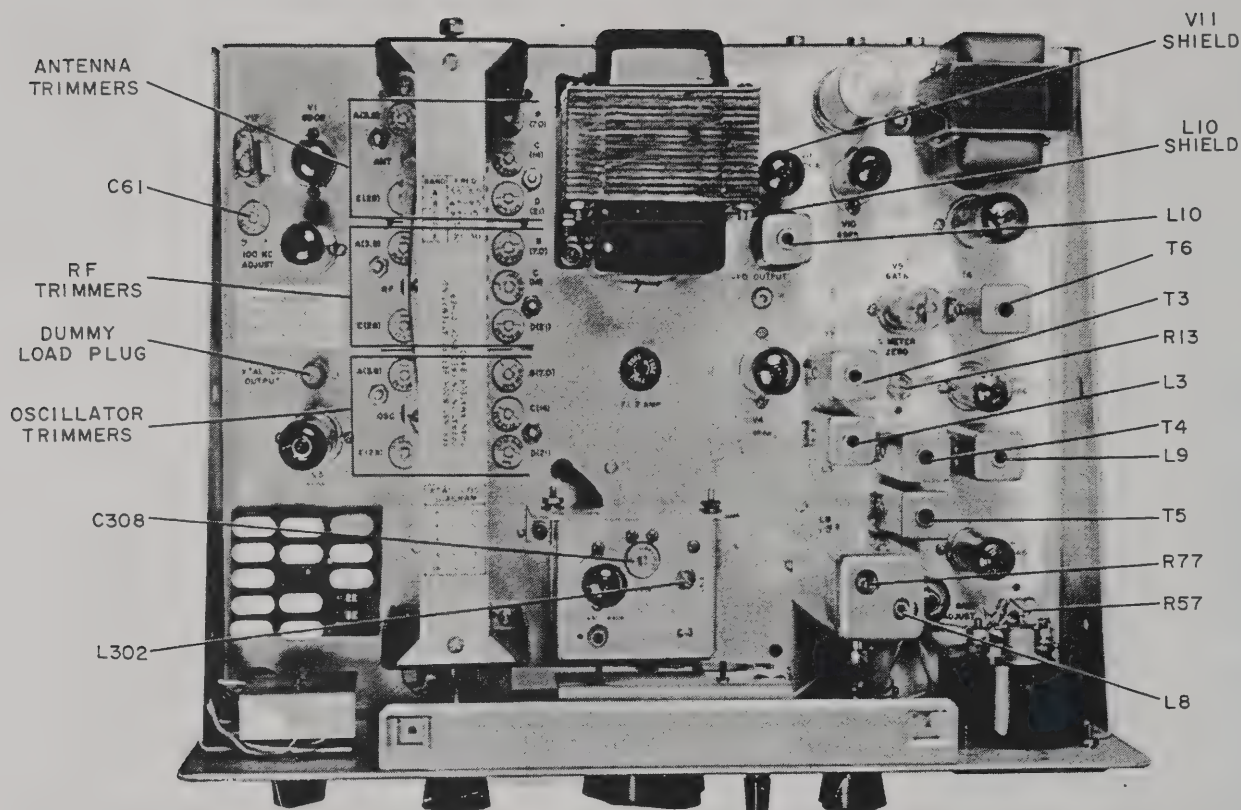


Figure 4-1. Location of Adjustments

rotary ceramic trimmers used in the receiver are at maximum capacity when the large notch is positioned midway between the two mounting screws. Rotation in either direction from this position reduces capacity with minimum being at 180 degrees from maximum.

#### 4.5.1 455-KILOCYCLE I-F ALIGNMENT.

- Set EMISSION switch to USB, and tune to the calibrate signal at 3.7 mc.
- Adjust calibrator output attenuator to provide S-meter reading of approximately S-3.
- Adjust the slugs of L9 and T6 for peak meter reading. Reduce calibrator output as necessary to maintain a low meter reading. Repeat L9 and T6 adjustments.
- Adjust C122 and C123, SSB filter input and output trimmers, for peak meter reading.
- Switch to CW position, and adjust C126 and C127, CW filter input and output trimmers, for

peak meter reading. Rock receiver tuning dial to make sure signal is centered in filter passband.

- Switch to AM position, and adjust top and bottom slugs of T4 and T5 for peak meter reading. This completes alignment.

- If a signal generator is used for this alignment, remove vfo tube V301, connect generator to pin 2 of V4, and adjust frequency to center of filter pass band. Align as outlined above, disconnect generator, and replace V301.

#### 4.5.2 BAND-PASS I-F ALIGNMENT.

- Set EMISSION switch to CW, and tune to the calibrate signal at 3.7 mc.
- Make two swamping networks by connecting a .01-uf capacitor in series with a 1000-ohm resistor and connecting alligator clips to the two remaining leads.



c. Connect one swamping network from T3 primary (terminal 1) to ground and the other from L3 (terminal 1) to ground.

d. Adjust attenuator to provide meter reading of approximately S-3.

e. Peak the secondary of T3 (top of can) using a Walsco 2543 or equivalent type tuning tool.

f. Remove both swamping networks and swamp T3 secondary (terminal 3 to ground). Peak T3 primary (bottom of can), and peak L3.

g. Remove swamping network from T3 secondary. This completes band-pass i-f alignment.

h. If a signal generator is used for this alignment, disable the h-f crystal oscillator by removing the crystal for the 3.6-mc band. Connect the signal generator to the XTAL OSC OUTPUT jack, and set to 3.055 mc. Tune receiver to the generator signal at approximately 100 on the dial. Align as above, disconnect generator, and replace crystal.

#### 4.5.3 R-F CIRCUIT ALIGNMENT.

a. Tune to the calibrate signal at 3.7 mc with the EMISSION switch in either USB or LSB position. Connect a 47-ohm resistor or a dummy load such as the DL-1 to the 75S-3/3A ANT jack. During the following procedures, adjust the calibrator output attenuator as necessary to maintain a meter reading of approximately S-3.

b. Set both A (3.8) RF and ANT trimmer capacitors so the large notches point to approximately 2 o'clock when viewed as shown in figure 4-1. Set the A (3.8) OSC trimmer so the large notch points to the rear of the chassis.

c. Set the PRESELECTOR to 2.1 on the logging scale.

d. Adjust the OSC, RF, and ANT slugs located on the movable platform the maximum S-meter indication. Adjust the OSC slug first. After making these adjustments, make sure the PRESELECTOR tuning peaks at 2.1 on the logging scale.

e. Set BAND switch to 28A, PRESELECTOR to 8.9 on the logging scale, and tune to the calibrate signal at 28.6 mc. Maintain S-3 signal level.

f. Adjust E (28) OSC, RF, and ANT trimmer capacitors for peak S-meter reading. Adjust OSC trimmer first.

g. Set BAND switch to 21.0 and PRESELECTOR to 7.9 on the logging scale. Tune to calibrate signal at 21.1 mc. Maintain S-3 signal level.

h. Adjust D (21) OSC, RF, and ANT trimmers for peak S-meter reading. Adjust OSC trimmers first.

i. Set BAND switch to 14.8 and PRESELECTOR to 7.0 on the logging scale. Tune to calibrate signal at 14.9 mc. Maintain S-3 signal level.

j. Adjust C (14) OSC trimmer for peak S-meter reading.

k. Set BAND switch to 14.2 and PRESELECTOR to 6.6 on the logging scale.

l. Adjust C (14) RF and ANT trimmers for peak meter reading. Maintain S-3 signal level.

m. Set BAND switch to 7.0 and PRESELECTOR to 3.9 on the logging scale. Tune to calibrate signal at 7.1 mc. Maintain S-3 signal level.

n. Adjust B OSC, RF, and ANT trimmers for peak S-meter reading. Adjust OSC trimmer first.

o. Disconnect the crystal calibrator output attenuator. This completes r-f alignment.

p. If signal generator and r-f vtm are used for this alignment, connect the generator output to the receiver ANT jack. Set generator output to frequencies listed, and align RF and ANT trimmers as outlined in preceding steps. Connect r-f vtm to XTAL OSC OUTPUT jack on bottom side of chassis, leaving load plug P1 in place. Align OSC trimmers as indicated except adjust for peak reading on the vtm. In step k, adjust PRESELECTOR near 6.6 on logging scale at the point where vtm reading peaks.

#### 4.5.4 VFO SIDEBAND FREQUENCY SHIFT ADJUSTMENT.

Set EMISSION switch to LSB, and tune to zero beat with calibrate signal at 3.7 mc. Without further movement of the dial, switch to USB, and adjust C308 (on vfo) for zero beat.

#### 4.5.5 CRYSTAL CALIBRATOR ADJUSTMENT.

a. Set receiver for AM reception, and tune to WWV at 15.0-mc at a time when the station is not transmitting tone.

b. Turn function switch to CAL position. Set 100 KC ADJUST trimmer C61 for zero beat of the calibrate signal against WWV.

#### 4.5.6 VFO DIAL CALIBRATION.

Calibrate the dial at 100. If zero beat with the calibrate signal does not occur at 0 and 200 +1 kc on the dial, there is end-point spread. If there is no end-point spread, but the hairline is not vertical when the dial is calibrated, a mechanical adjustment only is required. Refer to step h in the following procedure. To correct for end-point spread, make the following adjustments:

a. Set BAND switch to any band and function switch to CAL, and tune calibrate signal to zero beat at 200 end of the dial.

b. Set hairline to 200 with zero set knob.

c. Tune calibrate signal to zero beat at 0 end of the dial. Note the difference in kilocycles between the hairline and dial 0 (example: -1.5 kc).

d. Without moving the hairline, move the dial to the opposite side of 0 by an amount equal to the frequency difference noted above (example: +1.5 kc).

e. Adjust L302 for zero beat. It is located on top of the vfo can.

f. Set the hairline at 0 with zero set knob.

g. Tune the calibrate signal to zero beat at the 200-end of the dial. If zero beat does not occur at exactly 200, repeat steps b through e.

## SECTION 4

### Service Instructions

h. After adjustment of end points, if the hairline is not vertical in the dial window, loosen the set-screws on the dial hub, and move the dial relative to the oscillator shaft so that, at zero beat, the dials reads 0 to 200 with the hairline vertical.

i. After these adjustments of the vfo calibration, make the vfo sideband frequency shift adjustment as outlined in paragraph 4.5.4.

#### 4.5.7 TUNABLE BFO ALIGNMENT.

a. Make sure the BFO tuning knob is correctly positioned on the shaft. At the control end stops, the knob pointer should be at approximately 7 o'clock (ccw end) and 5 o'clock (cw end).

b. Rotate BFO knob to extreme counterclockwise.

c. Turn on calibrator and tune receiver to zero beat in USB position.

d. Turn on tunable bfo, and set BFO knob to 0.

e. Adjust L10 for zero beat.

#### 4.5.8 NOTCH FILTER ALIGNMENT.

a. Check REJECTION TUNING knob position. Pointer should be at OFF when the knob is at the counterclockwise stop. Leave at OFF position.

b. Tune to the calibrate signal on a band which provides a calibrate signal level of approximately S-9 plus

20 db in either USB or LSB position. Center signal in filter passband (approximately 1350-cps tone).

c. Set REJECTION TUNING knob to midscale (pointer vertical).

d. Alternately adjust L8 and R77 for maximum depth of notch as indicated by minimum S-meter reading. If the Q-multiplier exhibits a tendency to ring or oscillate, back off slightly on R77.

#### 4.5.9 I-F GAIN ADJUSTMENT.

To set i-f gain control R57, a signal generator with a calibrated output attenuator is required. Connect the signal generator to the receiver ANT jack, and adjust to 1.5 microvolts output at 28.6 mc. Tune the receiver to the generator signal, and adjust R57 to the point which produces a just-perceptible increase above the no-signal reading on the S-meter. Do not make this adjustment until receiver alignment has been completed.

#### 4.5.10 S-METER ZERO ADJUSTMENT.

a. Set receiver to the middle of any operating band, and peak PRESELECTOR for maximum output.

b. Set RF GAIN to maximum, and short ANT jack to ground.

c. Set S-METER ADJUST (R13) so S-meter reads zero.

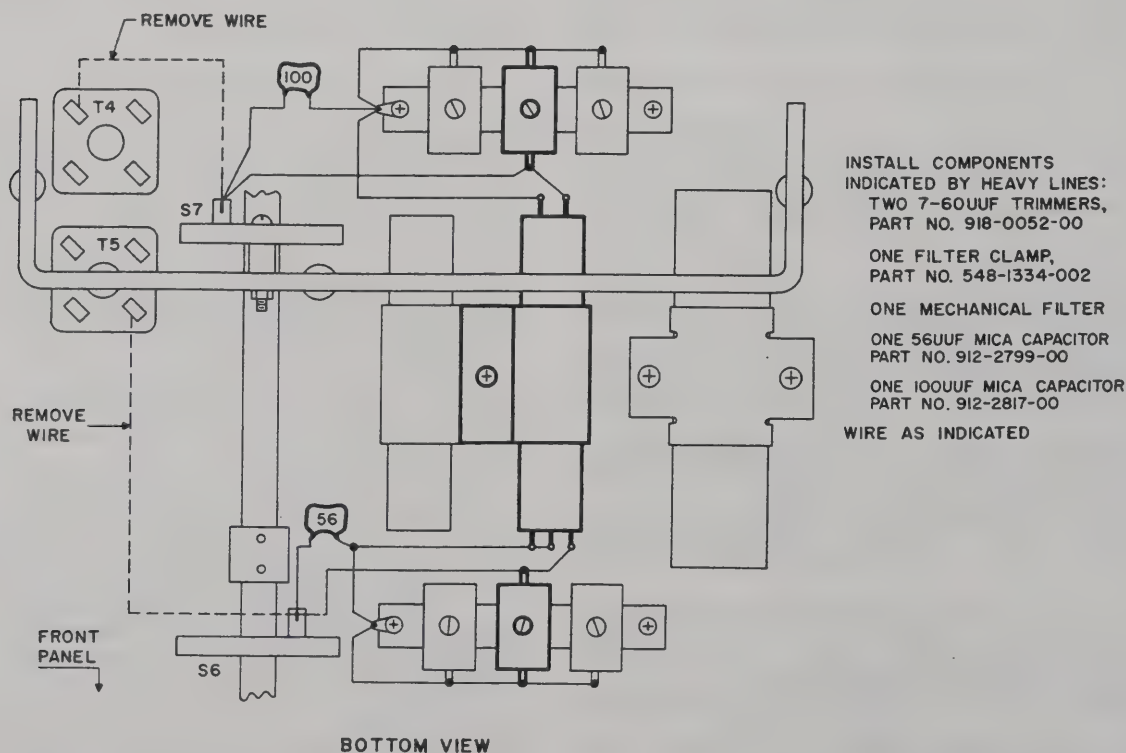


Figure 4-2. Optional Filter Installation Diagram

#### 4.6 Installation of Optional Filters.

Space is provided in the 75S-3/3A to install accessory filters in place of the 455-kc transformers used in the AM function. Figure 4-2 shows the placement of parts and required wiring changes.

To obtain access to the front trimmer-mounting strip, remove the long strip located behind the front panel and fastened by machine screws to the brackets for the front cabinet feet. Bend the mounting tabs on the new trimmer capacitors slightly toward each other, snap the trimmers into place on the trimmer-mounting strips, and solder the appropriate lugs to the ground buses as shown in figure 4-2. Install the filter as shown. If necessary, bend the new filter

clamp slightly to provide a good fit around the filter. One end of the filter has three terminals, one of which has no insulation around it. This is the case ground. Connect this terminal and either one of the two remaining terminals to chassis ground. Either of the terminals on the opposite end of the filter may be used for the ground connection indicated. Dress the new wiring carefully to prevent shorts. Where needed, use spaghetti from removed wiring.

When installation and wiring are completed, turn the receiver on, and tune to the calibrate signal at 14.0 mc. Adjust the filter trimmer capacitors for maximum S-meter reading with the signal centered in the filter passband. Available filters and installation kit of parts are listed in table 5-2.





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**installation****1.1 Unpacking.**

Lift the receiver out of the carton and packing material. Examine for visible damage. If the receiver has been damaged in shipment, save the box and packing material, and notify the transportation company. Complete and mail the equipment registration card. Check tubes and crystals for proper seating in sockets. Check tuning controls and switches for freedom of action. Check that the special Mu-Metal shields are in place on tube V11 and coil L10 (see figure 4-1). Check the equipment included with the receiver against table 1-1.

**1.2 Cabling.**

**1.2.1 EXTERNAL CONNECTIONS.** Figure 1-1 shows the location of jacks for external connections to 75S-3 and 75S-3A receivers. The power cable plugs into socket J13. The ANT jack is a nominal 50-ohm antenna input. The 4  $\Omega$  AUDIO jack is for connection of a speaker.

**CAUTION**

DO NOT connect the a-c power cord to the 115-volt a-c line until power plug P6 has been plugged into J13. To avoid damage to the receiver, make sure the key on P6 is properly aligned with the keyway on J13.

To connect the receiver for mute operation, a means of supplying a ground while receiving must be applied to the MUTE jack. Opening this circuit mutes the receiver. A set of normally closed contacts on a relay which is keyed with the transmitter may be used for this purpose. To use this circuit, the receiver must be operated in the STBY position.

The CW SIDETONE jack is a high-impedance, low-level audio input (0.2 volt rms, typical) to the receiver. Audio from a sidetone oscillator may be applied to this

TABLE 1-1. EQUIPMENT FURNISHED WITH 75S-3/3A

QUANTITY	DESCRIPTION	FUNCTION	PART NUMBER
2	Phono-type connectors	External connections	361-0062-00
1	Fuse, 2-ampere	Spare	264-4070-00
1	Power cord	A-c power	544-3121-00
1	Power plug adapter	A-c power	368-0138-00
1	Instruction book	75S-3/3A instructions	523-0148-00
1	Logbook	Station logging	523-0755-820
1	Cable marker card	Cable identification	280-2946-00
1	No. 4 Bristo wrench	Accessory tool	024-2900-00
1	No. 6 Bristo wrench	Accessory tool	024-9730-00
1	No. 8 Bristo wrench	Accessory tool	024-0019-00
1	No. 10 Bristo wrench	Accessory tool	024-9710-00

SECTION 1  
Installation

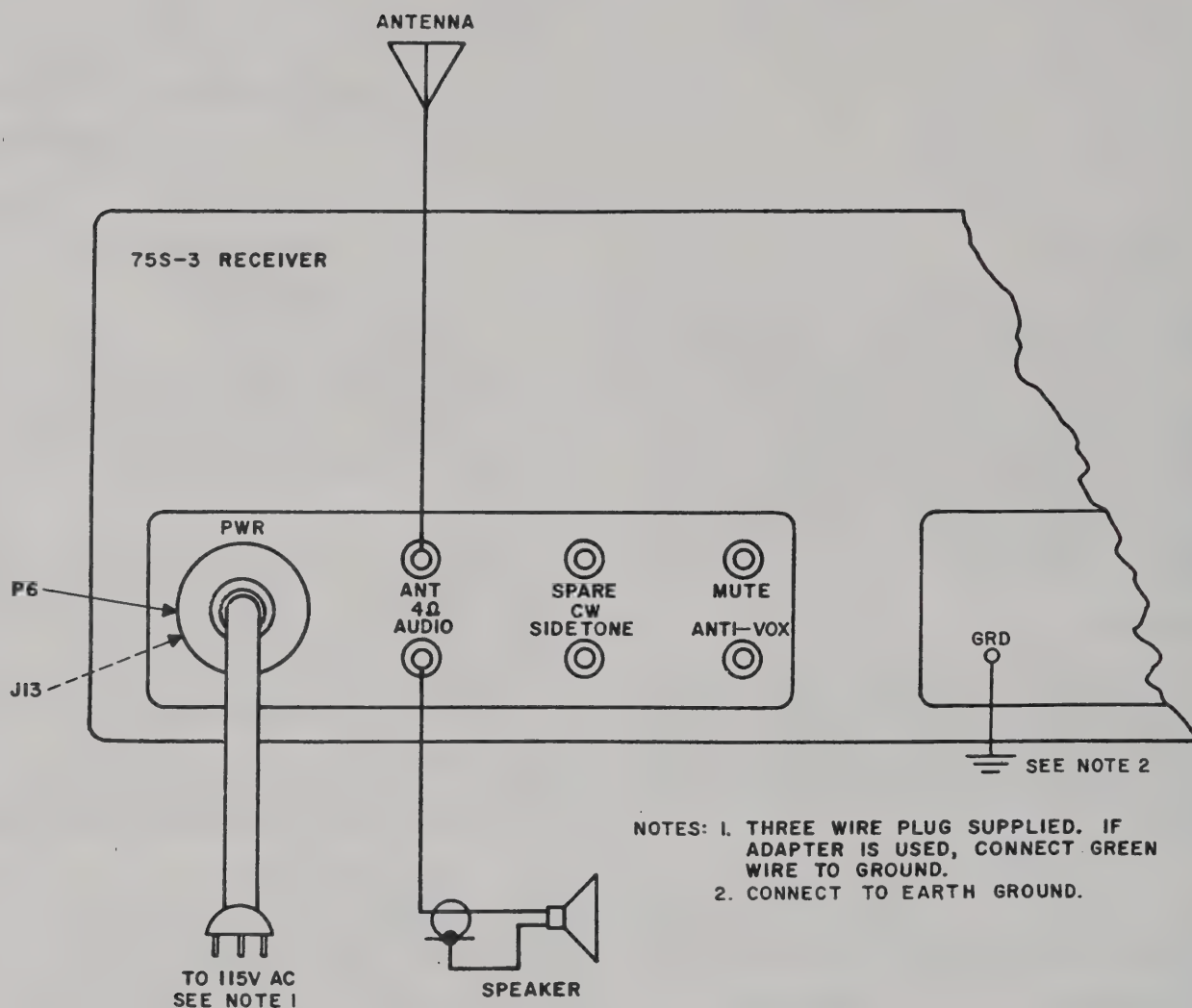


Figure 1-1. External Connections

jack to provide a cw monitoring circuit through the receiver audio system.

The ANTI-VOX jack is a 500-ohm audio output from the receiver. At normal speaker volume levels, 5 to 10 volts rms is provided at this output. This voltage is normally applied to anti-vox circuits in an associated transmitter.

The PHONES jack on the front panel is connected through a resistive network to a 500-ohm tap on the output transformer. Therefore, best results will be obtained if headphones used are 500 ohms or higher impedance. The speaker is silenced when headphones are plugged in.

1.2.2 CABLING WITH 32S-3 TRANSMITTER. Figure 1-2 shows a complete station interconnection for a 75S-3 or 75S-3A Receiver, 32S-3 Transmitter, and

312B-4 Station Control. The RG-58C/U cables indicated are slightly larger in diameter and two inches shorter than the audio and control cables. If the 312B-4 is not used, connect a 4-ohm speaker, such as the 312B-3, to 4Ω AUDIO jack on receiver. Connect ANTI-VOX jack on receiver directly to ANTI-VOX jack on transmitter. Omit PHONE PATCH and PTT connections.

To connect the 75S-3 or 75S-3A and the 32S-3 for transceiver operation, use the patch cables furnished with the transmitter, and connect as follows:

- a. Connect the 32S-3 and 75S-3/3A as shown in figure 1-2.
- b. Remove P1 from XMTR XTAL OSC jack J7 (under 32S-3 top cover), and plug it into 32S-3 RCVR XTAL OSC jack J6. Remove the 100-ohm dummy load plug from the 75S XTAL OSC OUTPUT jack, and plug it into 32S-3 XMTR XTAL OSC jack J7.

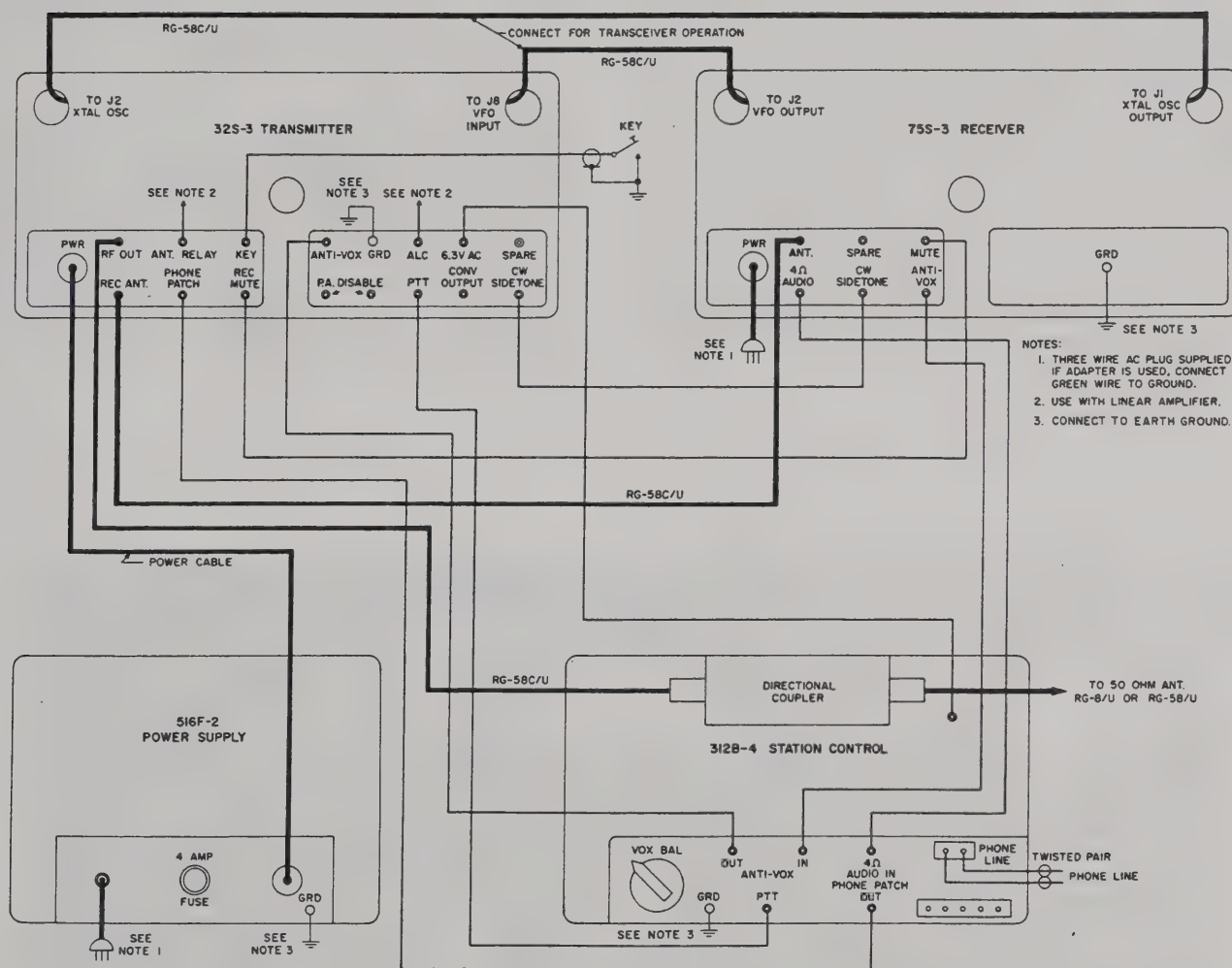


Figure 1-2. Station Interconnections



## SECTION 1

### Installation

**1.2.3 CABLING WITH KWM-2/2A TRANSCEIVER.**  
The 75S-3/3A may be used with a KWM-2/2A to provide separate transmit and receive frequencies. Connect the patch cables as follows:

a. Using an RG-58C/U patch cable, connect REC ANT jack on KWM-2/2A to ANT jack on 75S-3/3A.

b. Connect the 500  $\Omega$  jack on the KWM-2/2A to the ANTI-VOX jack on the 75S-3/3A. If a 312B-4 or 312B-5 is used, connect the KWM-2/2A 500  $\Omega$  jack to ANTI-VOX IN and the 75S-3/3A ANTI-VOX jack to ANTI-VOX OUT on the 312B-4/5.

c. Connect the REC MUTE jack J20 on the KWM-2/2A to the MUTE jack on the 75S-3/3A.

The station speaker may be plugged into either the 4  $\Omega$  jack on the KWM-2/2A or the 4  $\Omega$  AUDIO jack on the 75S-3/3A. For normal mute operation, set the 75S-3/3A function switch to STBY. Receiver output from the KWM-2/2A is turned off by setting AF GAIN to zero. For transmit and receive operation on the same frequency, reduce the 75S-3/3A AF GAIN to zero, and operate the KWM-2/2A in a normal manner.

### 1.2.4 CABLING WITH OTHER TRANSMITTERS.

a. To provide receiver muting when using 75S-3/3A with KWS-1, connect a cable from pins 5,6 on J102 (receiver disable) in the transmitter to MUTE jack on the receiver. Connect a cable from receiver ANTI-VOX jack to pin 7 on J102 (500-ohm audio) in the KWS-1. Connect cable shield to ground.

b. To use the 75S-3/3A with the 32V-3, connect a cable from the receiver MUTE jack to receiver disabling pins 24 and 25 on the transmitter.

c. To use the 75S-3/3A with other makes of transmitters, connect muting, cw sidetone, and anti-vox provisions in the receiver as applicable. The requirements for use are outlined in paragraph 1.2.1.

### 1.3 Initial Checks.

Lift the top cover, and make sure the dummy load (see figure 4-1) is plugged into the XTAL OSC OUTPUT jack unless the receiver is connected for transceiver operation. Recheck the interconnections to make sure the patch cables are plugged into the appropriate jacks. Be sure that RG-58C/U cables, rather than the audio and control cables, have been used for all r-f applications. Check to ensure the special Mu-Metal shields are in place on tube V11 and coil L10.

# section 2

## operation

### 2.1 Calibration.

- After making external connections, set controls as shown in figure 2-1.
- Set BAND switch (11) to desired frequency range. If receiver is 75S-3A, set crystal board selector (10) so desired set of bands appears in window.
- Set dial to 0, 100, or 200 with tuning knob (3).
- Adjust PRESELECTOR (2) for maximum signal or noise output.
- Tune back and forth near 0, 100, or 200 until calibrate signal is at zero beat.
- Adjust zero set knob (4) until dial is calibrated.

### 2.2 Single-Sideband Tuning.

- Set controls as shown in figure 2-1, except set function switch (1) to OPR, and the BFO knob fully counterclockwise until a click is heard.
- Set EMISSION switch (12) to desired sideband.
- Adjust PRESELECTOR (2) for maximum signal or noise output.
- Tune in signal and adjust AF GAIN (9) for desired audio output level.

When listening to strong signals, a reduction in background noise under no-modulation conditions may be

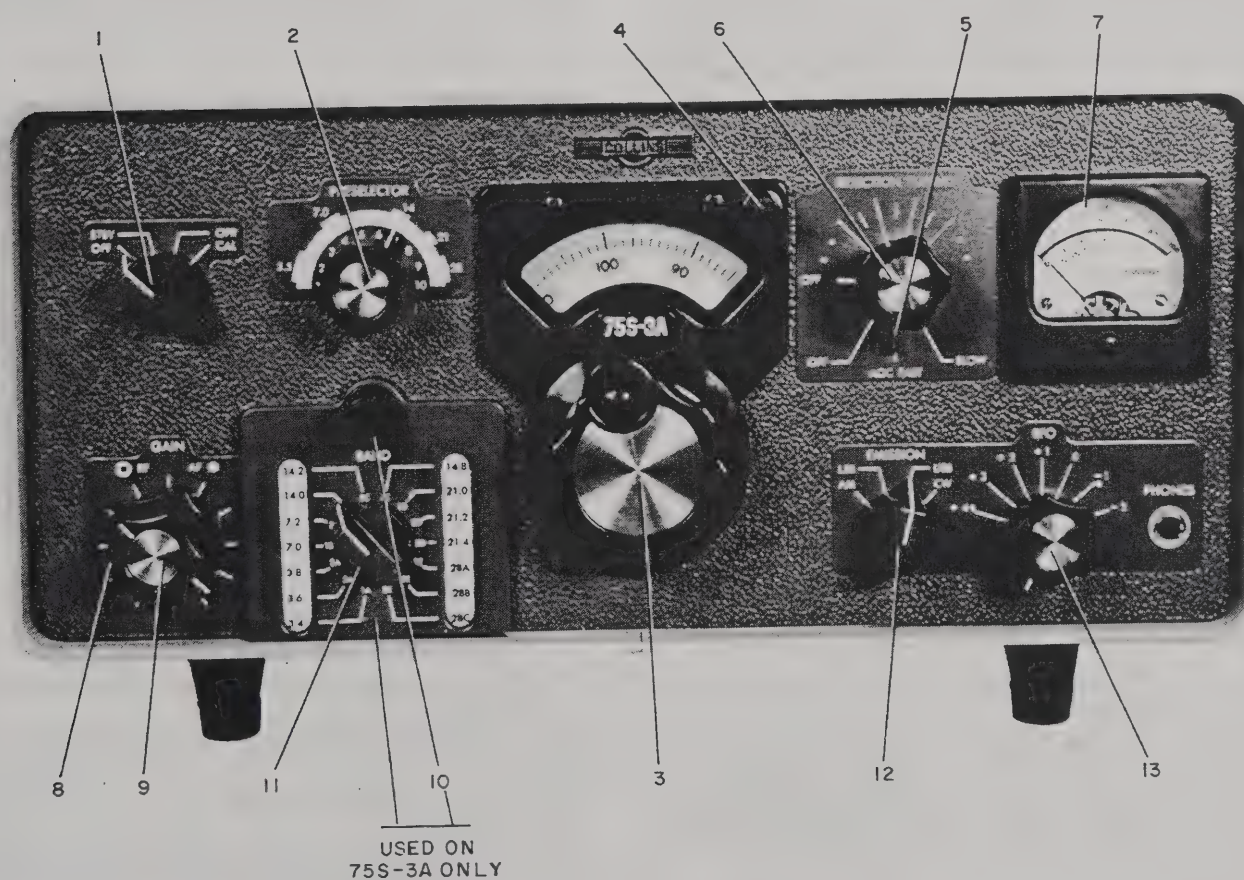


Figure 2-1. Operating Controls



## SECTION 2

### Operation

obtained by rotating RF GAIN control (8) counterclockwise, away from the maximum position. As this is done, S-meter (7) static reading will shift upscale. At proper gain control setting, meter will kick about one or two S-units on peaks. For example, if the weakest of the desired signals is peaking at S-9, set gain control so that static meter reading is S-7 to S-8. This retains accurate meter readings.

To read frequency, add the dial setting to the BAND switch setting. For example, if the BAND switch is set to 3.8 and the dial is set to 5, the frequency is 3.805 mc. If the BAND switch is set to 3.8 and the dial to 170, the frequency is 3.970 mc.

### 2.3 CW Tuning.

a. Set controls as outlined in paragraph 2.2 except set EMISSION switch to CW.

b. Rotate the BFO knob (13) clockwise to energize the tunable bfo. Set to either +1 or -1.

c. Adjust BFO knob to yield the most pleasing beat note with the desired signal centered in the filter pass band.

d. Read approximate frequency as follows: When BFO knob is set to the plus side of zero, add kilocycle reading from bfo scale to dial reading. Subtract bfo reading for minus settings of the knob. If a precision reading is desired, set the BFO knob, and recalibrate the main tuning dial using the crystal calibrator. When the main dial is calibrated in this manner, further adjustment of the BFO knob or switching to the crystal-controlled BFO requires recalibration of the dial.

Either fast or slow AGC (5) may be used, or it may be turned off. If AGC is turned off, decrease RF GAIN control setting to prevent receiver overloading. Adjust AF GAIN control to provide desired audio level. In general, it is best to set r-f gain at a point just below that which causes signal to overload receiver. This provides optimum sensitivity.

Tuning may be facilitated by switching first to USB to tune in the desired signal and then switching to CW to reduce interference. The beat note will be the same in either position. The wider pass band provided in USB is also useful for net operation.

### 2.4 AM Tuning.

a. Set controls as outlined in paragraph 2.2.

b. Set EMISSION switch to AM.

c. Set AGC switch to FAST.

d. Tune in signal, and adjust AF GAIN for desired audio output level.

If desired, SSB methods may be used for AM reception. Set EMISSION switch to either USB or LSB position; use tuning procedure for a single-sideband signal. Once the desired signal is tuned in, switching to the opposite sideband may yield a more readable signal. This method of reception is useful under conditions of severe interference or extreme fading.

### 2.5 RTTY Tuning.

This type of operation requires an external RTTY converter and printer. Tune receiver as follows:

a. Set controls for SSB reception as outlined in paragraph 2.2 with EMISSION switch in USB position.

b. Turn on tunable bfo by rotating BFO knob (13) clockwise.

c. Set the pointer on the BFO tuning knob at the dot near -1 on the calibrated scale.

d. Tune the receiver for maximum S-meter reading on the desired RTTY signal.

e. Fine adjustment of the BFO tuning knob then will produce 2125 cps and 2975 cps mark and space signals at the receiver audio output. To reverse the mark and space signals, reset the BFO tuning knob to the dot near +4 on the calibrated scale.

### 2.6 Rejection Tuning.

An interfering heterodyne or cw signal may be reduced in level or eliminated by operation of the REJECTION TUNING knob (6). The off position for this control is at the end of extreme counterclockwise rotation. The on-off switch is provided with a positive stop rather than a detent. Do not force the knob. Clockwise rotation of the knob from the off position moves the rejection notch across the receiver pass band. It is recommended that the operator familiarize himself with the operation of this control by tuning the notch across the signal from the crystal calibrator.

When the receiver is initially placed in operation, it may be necessary to touch up the adjustment of R77. Refer to paragraph 4.5.8.

### 2.7 Use of S-Meter.

The S-meter is intended primarily to indicate relative rather than absolute signal strength. A nominal meter reading of S-9 is obtained with an input signal of 100 microvolts. The threshold of agc operation is set at the factory to a nominal value of 1.5 microvolts. Due to normal tolerances in receiver operation, agc threshold varies slightly from band to band causing correspondingly slight changes in the number of db represented by each S-unit. The db scale is calibrated with 1 microvolt as a reference; therefore, an S-9 signal of 100 microvolts represents a 40-db increase over the reference signal level. Since agc is not applied to very weak signals, S-zero is arbitrarily established at 10 db on the scale. Typical meter readings, therefore, can represent from 3.3 to slightly over 4 db per S-unit. A figure of 4 db can be taken as an average.

### 2.8 Transceiver Operation with 32S-3 Transmitter.

a. Make sure patch cables are connected as outlined in paragraph 1.2.2.

b. Set FREQ CONTROL (1) on 32S-3 to REC VFO position.

c. Set OFF-STBY-OPR-CAL switch on 75S-3/3A to STBY position.

d. Set both BAND selectors to the same desired band and both EMISSION switches to the same position (either USB, LSB or CW).

e. Tune both receiver and transmitter as in normal operation. Both transmit and receive functions operate from the receiver vfo; the transmitter vfo is not used



in transceiver operation. Switching the transmitter FREQ CONTROL (1) back to TRANS VFO position will allow separate operation of the two units within the same 200-kc band.

## NOTE

In CW transceiver operation, the 75S variable bfo will have to be used to obtain the desired beat note if it is desired to transmit zero beat with another station.

**CAUTION**

When operating in transceiver service, do not operate the transmitter while the receiver is tuned outside band limits; the transmitted signal will be out of the band. Do not attempt operation with receiver and transmitter set on different 200-kc bands, even when operating in TRANS VFO position. With patch cables connected for transceiver operation, the receiver h-f crystal oscillator controls injection frequency to the transmitter second mixer.

If operation on different 200-kc bands is desired (that is, receive on one 200-kc band and transmit on another), remove the transceiver patch cables and operate the units as in normal independent operation.

If transmitted frequency is changed by any great amount, be sure to redip the PA plate current and check the loading. This will be most important on the 80- and 40-meter bands.

Some operating experience will indicate the amount of frequency excursion possible without readjustment.

Do not attempt operation in transceiver service with any other receiver not having the same frequency mixing scheme.

f. To restore both units to normal operation, remove the two patch cables connecting oscillator signals, replace P1 in J7 on the transmitter slug rack (under top cover), and replace the 100-ohm load plug in the receiver XTAL OSC OUTPUT jack.

## 2.9 Operation Outside Amateur Bands.

Additional 10-meter band coverage, or coverage outside the amateur bands may be obtained by plugging an appropriate crystal into the crystal mounting board. Two extra sockets are provided in the mounting board for this purpose. The total 3.4- to 30.0-megacycle coverage available is divided into five segments, designated A, B, C, D, and E. The frequency range of each of these segments is listed in the total coverage column of table 2-1. The letter portions of the crystal socket locations shown in figure 2-2 indicate which sockets may be used for crystals to cover a 200-kc band within a specific total coverage segment. For example, crystals for extended 10-meter coverage must be plugged into sockets marked E.

The proper crystal for coverage of a specific 200-kc band may be selected as follows:

a. If the lower edge of the desired band is 11.8 mc or less, the required crystal frequency is equal to the

TABLE 2-1. CRYSTAL FREQUENCIES AND OPERATING BANDS

BAND-SWITCH POSITION	FREQUENCY BAND	CRYSTAL SUPPLIED	CRYSTAL SOCKET CONNECTED	TOTAL COVERAGE
1A - 3.4	3.4 - 3.6 mc	6.555 mc	1A	A 3.4 - 5.0 mc
2A - 3.6	3.6 - 3.8 mc	6.755 mc	2A	
3A - 3.8	3.8 - 4.0 mc	6.955 mc	3A	
1B - 7.0	7.0 - 7.2 mc	10.155 mc	1B	B 6.5 - 9.5 mc
2B - 7.2	7.2 - 7.4 mc	10.355 mc	2B	
1C - 14.0	14.0 - 14.2 mc	8.5775 mc	1C	C 9.5 - 15.0 mc
2C - 14.2	14.2 - 14.4 mc	8.6775 mc	2C	
3C - 14.8	14.8 - 15.0 mc	8.9775 mc	3C	
1D - 21.0	21.0 - 21.2 mc	12.0775 mc	1D	D 15.0 - 22.0 mc
2D - 21.2	21.2 - 21.4 mc	12.1775 mc	2D	
3D - 21.4	21.4 - 21.6 mc	12.2775 mc	3D	
1E - 28A	28.5 - 28.7 mc	15.8275 mc	2E	E 22.0 - 30.0 mc
2E - 28B	As selected	Not supplied	2E	
3E - 28C	As selected	Not supplied	3E	



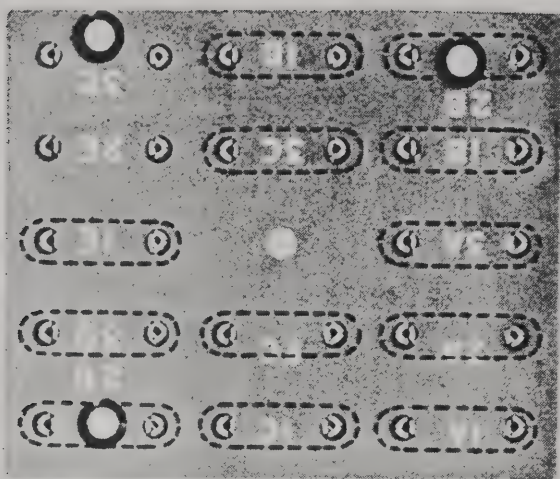


Figure 2-2. Crystal Socket Locations

lower edge of the desired band plus 3.155 mc. For example, if the desired band is 4.0 to 4.2 mc, the required crystal frequency is 7.155 mc.

b. If the lower edge of the desired band is 12.0 mc or higher, the required crystal frequency is equal to half the sum of the desired lower band edge and 3.155 mc. For example, if the desired band is 14.4 or 14.6 mc, the required crystal frequency is 8.7775 mc.

Extra crystals available are listed in section 6, Parts List.

Approximate settings for the PRESELECTION are shown in figure 2-3. For example, if coverage from 10.0 to 10.2 mc is desired, plug the appropriate crystal into a socket marked C, turn the BAND switch to that position, and set the PRESELECTION to approximately 3.2 on the logging scale. Peak the PRESELECTION tuning as in normal operation. The ANT, RF, and OSC trimmer capacitors (those marked C in the example above) may also be peaked if optimum performance is desired at frequencies outside the amateur bands. On some bands it is possible to peak the PRESELECTION tuning at an image frequency or at a different order of output frequency from the crystal oscillator; however, there is only one correct setting for coverage within a given 200-kc band.

The above information also applies to the 75S-3A except that two crystal mounting boards are provided in this receiver. The amateur-band board is located under the chassis. To obtain access, refer to paragraph 4.1. When crystal board selector (10) is switched to extended coverage position, the above-chassis board is switched into the circuit. The crystal socket locations are the same for both boards. Space is provided in the window adjacent to the BAND switch to mark in-band information. A pencil may be used to allow erasure if changes are made.

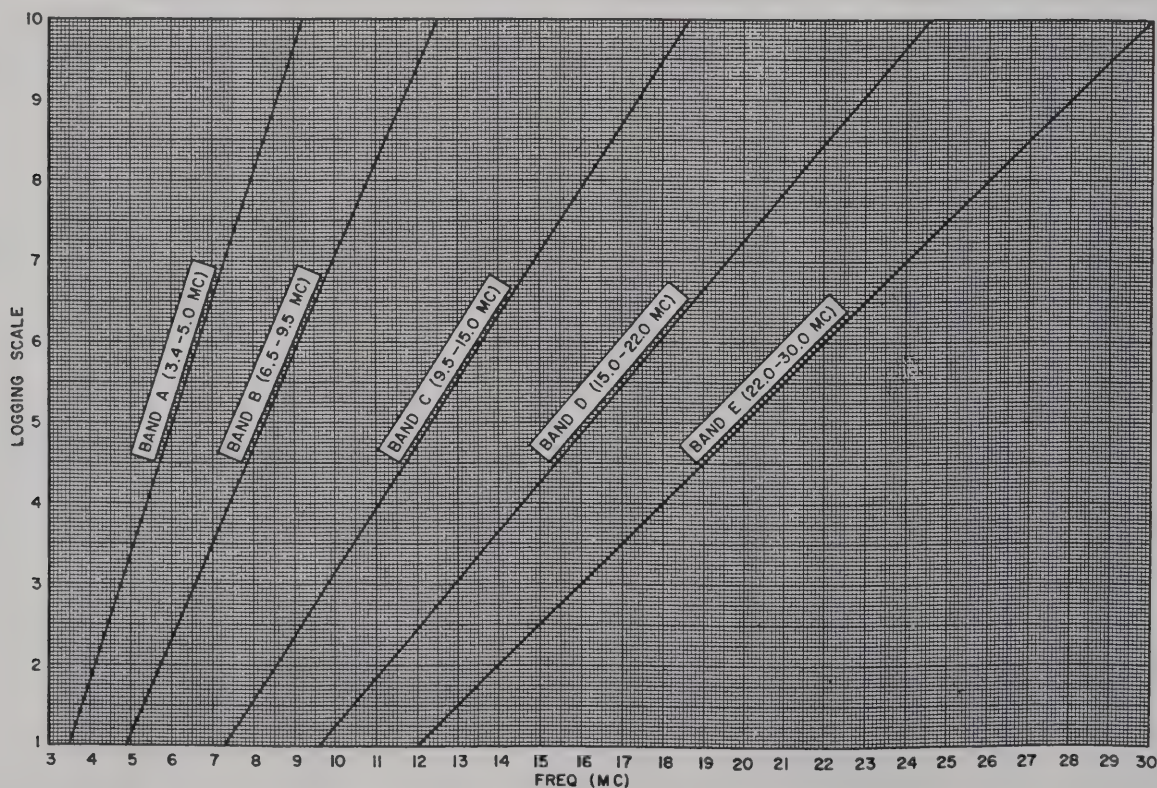


Figure 2-3. Preselector Calibration Curves



## principles of operation

### 3.1 Block Diagram.

Figure 3-1 is a block diagram for 75S-3 and 75S-3A Receivers. Double conversion is used, with injection voltage for the first conversion provided by a crystal-controlled oscillator. A band-pass i-f, 200 kilocycles wide, is used to couple the first and second mixers. Injection voltage for the second mixer is furnished by a vfo with a tuning range of 200 kc. The 455-kc output frequency of the second mixer is coupled through the i-f system to separate AM and SSB detectors. Injection voltage for the product detector is provided by either a crystal-controlled bfo or a tunable bfo. The 75S-3A is identical to the 75S-3 except that it is equipped with an extra h-f crystal mounting board on the chassis, a crystal board selector switch on the front panel, and associated components. Figure 7-1 is a schematic diagram for both receivers, with circuit differences noted.

### 3.2 R-F and Mixer Circuits.

The r-f amplifier grid, high-frequency mixer grid, and crystal oscillator plate circuits are resonated by slug-tuned coils. The slugs are mechanically ganged and linked to the PRESELECTOR tuning knob. The required tuning ranges of these circuits are obtained by switching appropriate values of fixed capacitance in parallel with the coils. The total 3.4- to 30-mc tuning range of the receiver is divided into five segments for band-switching purposes, as noted in table 2-1. The tuned circuit LC ratio is thereby varied within appropriate limits for each of the five segments.

Signals within the particular 200-kc band selected are amplified by V2, the r-f amplifier, and coupled to the control grid of V3A, the first mixer. Injection voltage is coupled to the cathode of V3A. Products of mixing are selected in the plate circuit of V3A, tuned to 3.155 to 2.955 mc which is the band-pass i-f frequency. Signals are coupled to the control grid of second mixer V4A with vfo injection voltage applied to the cathode of this tube.

### 3.3 Oscillator Circuits.

**3.3.1 CRYSTAL OSCILLATORS.** High-frequency crystal oscillator V3B provides injection voltage for the first mixer. The crystal oscillator output frequency is always 3.155 mc higher than the lower edge of the selected band. On bands below 12.0 mc, the oscillator plate circuit is tuned to the crystal frequency. At 12.0 mc and higher, the plate circuit is tuned to the second harmonic. The secondary winding of T2 couples injection voltage to the first mixer cathode circuit and furnishes a d-c return

to ground for mixer tube V3A. Dummy load R41 stimulates the load presented by the 32S-3 Transmitter when connected for transceiver operation.

Crystal-controlled bfo V8B and associated circuitry furnishes injection voltage for the product detector. Crystals Y15 and Y16 provide the proper bfo frequency relationships to the mechanical filter passband to yield optimum audio response from the product detector. Crystal Y15 is used for lower sideband reception, and Y16 is used for upper sideband. Capacitor C95 and coil L-12 form a broadly resonant circuit at 455 kc. Oscillator voltage is developed across R49 and coupled by C100 to the cathode of V8A, the product detector tube.

The crystal calibrator circuit provides marker signals at multiples of 100 kc. Variable capacitor C61 provides for adjustment to zero beat with WWV. The output of this oscillator is coupled to the receiver antenna circuits.

**3.3.2 VARIABLE OSCILLATORS.** The vfo uses fixed capacitance and variable inductance to produce the required tuning range of 2.5 to 2.7 mc. Capacitor C303, in the frequency-determining network, is paralleled by variable capacitor C308 in series with diode CR301. This diode switches C308 in or out of the circuit, depending upon the polarity of a bias voltage impressed across the diode junction. The bias voltage is coupled to the diode through R303, and is positive in the USB position causing CR301 to switch C308 into the circuit. When C308 is properly adjusted, it shifts the vfo frequency by an amount equal to the frequency separation of crystals Y15 and Y16. This allows either sideband to be selected without retuning or recalibrating the dial. The vfo output voltage is coupled to the cathode of second mixer tube V4A and to the control grid of cathode follower V4B. The cathode follower prevents loading of the vfo circuits by cable capacity when operated in transceiver service.

Tube V11 and associated circuitry comprise a tunable bfo. The bfo tuning control is potentiometer R81. This control varies a positive d-c voltage applied to the junction of voltage-variable capacitor CR4. The junction capacity of this device is proportional to applied voltage. Adjustment of R81 therefore varies the output frequency of the bfo. Voltage for the tuning circuit is stabilized by a regulator consisting of Zener diode CR5 and resistor R82. Switch S13 completes the cathode circuit of either V8B or V11 thus turning on the desired bfo



and turning off the other. The output circuits of both oscillators are coupled to the product detector.

### 3.4 I-F And Detector Circuits.

Output from the second mixer is coupled to either one of two band-pass filters or 455-kc tuned circuits. A mechanical filter with 2.1-kc nominal bandwidth is provided for SSB reception. A band-pass crystal filter with 250 cps nominal bandwidth is selected in the CW position. For AM reception, two cascaded 455-kc transformers provide increased bandwidth. Output from these circuits is coupled through the Q-multiplier to the first i-f amplifier, V6. The cathode of V6 is returned to ground through potentiometer R57 which is used to set the gain of this stage at a point producing the proper agc threshold. The S-meter circuit is connected from the screen circuits of V6 and V7, the two i-f amplifiers, to the cathode of V7. Under no-signal conditions, the voltage developed across R13 is equal to that developed across R17, and the meter reads zero. Application of agc causes the cathode current of V7 and the combined screen current of V6 and V7 to decrease. The voltage across R17 increases, the voltage across R13 decreases, and the meter reads up-scale by an amount which is proportional to signal strength. Output voltage from the second i-f amplifier is coupled to the product detector, V8A. It is also coupled to separate AM and agc diode detectors. Injection voltage is applied to the cathode of the product detector.

### 3.5 Q-Multiplier And Notch Filter.

The notch filter is composed of coil L8 and associated capacitors and resistors. The rejection notch occurs at the resonant frequency of this circuit and is centered at 455 kc. Capacitor C132 is mechanically coupled to the REJECTION TUNING control which allows the notch frequency to be moved across the receiver i-f passband. Potentiometer R77 is adjusted to provide optimum Q and depth of notch. Switch S10 shorts the filter circuit in the OFF position. The Q-multiplier is a feedback circuit which includes L8. This circuit multiplies the Q of L8 approximately ten times, thereby obtaining a much deeper and narrower rejection notch than would be provided by the filter alone. The notch shape provided by this circuit allows unwanted signals to be rejected with minimum disturbance to desired signals.

### 3.6 AGC And Control Circuits.

Signal voltage is coupled from the secondary of transformer T6 to one of the diode plates in V9 and rectified. Agc voltage is developed across R24, the diode load resistor, and is applied to the r-f and i-f amplifier stages. Signal voltage is filtered from the agc line by R50 and C49. Generation of agc voltage is delayed until the signal voltage at the diode plate exceeds the cathode bias on V9. Potentiometer R57 in the cathode

of the first i-f amplifier tube is normally adjusted so that agc action is initiated with a receiver input signal of approximately 1.5 microvolts. This point is referred to as agc threshold. Agc time constant is determined by the amount of capacitance placed in parallel with R24. Added capacity in the SLOW position of the AGC selector produces a slower release characteristic.

Manual control of r-f gain is also accomplished through the agc line. A voltage divider circuit, consisting of resistors R33, R55, and RF GAIN control R56, is connected across the negative 65-volt bias line. At the maximum gain setting, this circuit places a one-volt static bias on the agc line to furnish proper operating bias for r-f amplifier V2. At lower control settings, increased bias is provided which reduces the gain. The d-c grid return for the first mixer stage and MUTE jack J11 are connected to the junction of resistors R33 and R58. When the receiver function switch is placed in the STBY position, a ground at J11 causes the receiver to operate in a normal manner. Removal of this ground causes cutoff bias to be applied to the mixer grid and increased bias on the agc line, thus muting the receiver.

### 3.7 Audio Circuits.

Audio voltage from the appropriate detector is selected by S8A on the EMISSION switch, and is coupled to the AF GAIN control. The CW SIDETONE jack, J10, is also connected to this point. A sidetone audio voltage of approximately 0.2 volt will produce a normal listening level at average gain settings. Audio is amplified in a two-stage amplifier consisting of tubes V8 and V10. Three audio outputs are provided. Jack J8 is a 4-ohm outlet for a speaker. The headphone jack is connected to a resistive divider across the 500-ohm tap on the output transformer. The divider provides a load for V10 when the impedance of headphones used is relatively high. The ANTI-VOX jack, J12, is also connected to the 500-ohm tap. At normal audio gain settings, 5 to 15 volts of audio are available at J12 for use with the anti-vox circuits in an associated transmitter.

### 3.8 Power Supply Circuits.

The internal power supply furnishes filament, plate, and bias voltages for the receiver. Bias voltage is obtained by rectifying a portion of the a-c voltage appearing from one leg of the high-voltage secondary to ground. The tube filaments and pilot lamps are connected in a way which allows operation from a 6-, 12-, or 24-volt source. Filament, plate, and bias voltages may be furnished by an external source such as a mobile power supply. Figure 7-1 illustrates the proper connections to the power plug for this type of operation.

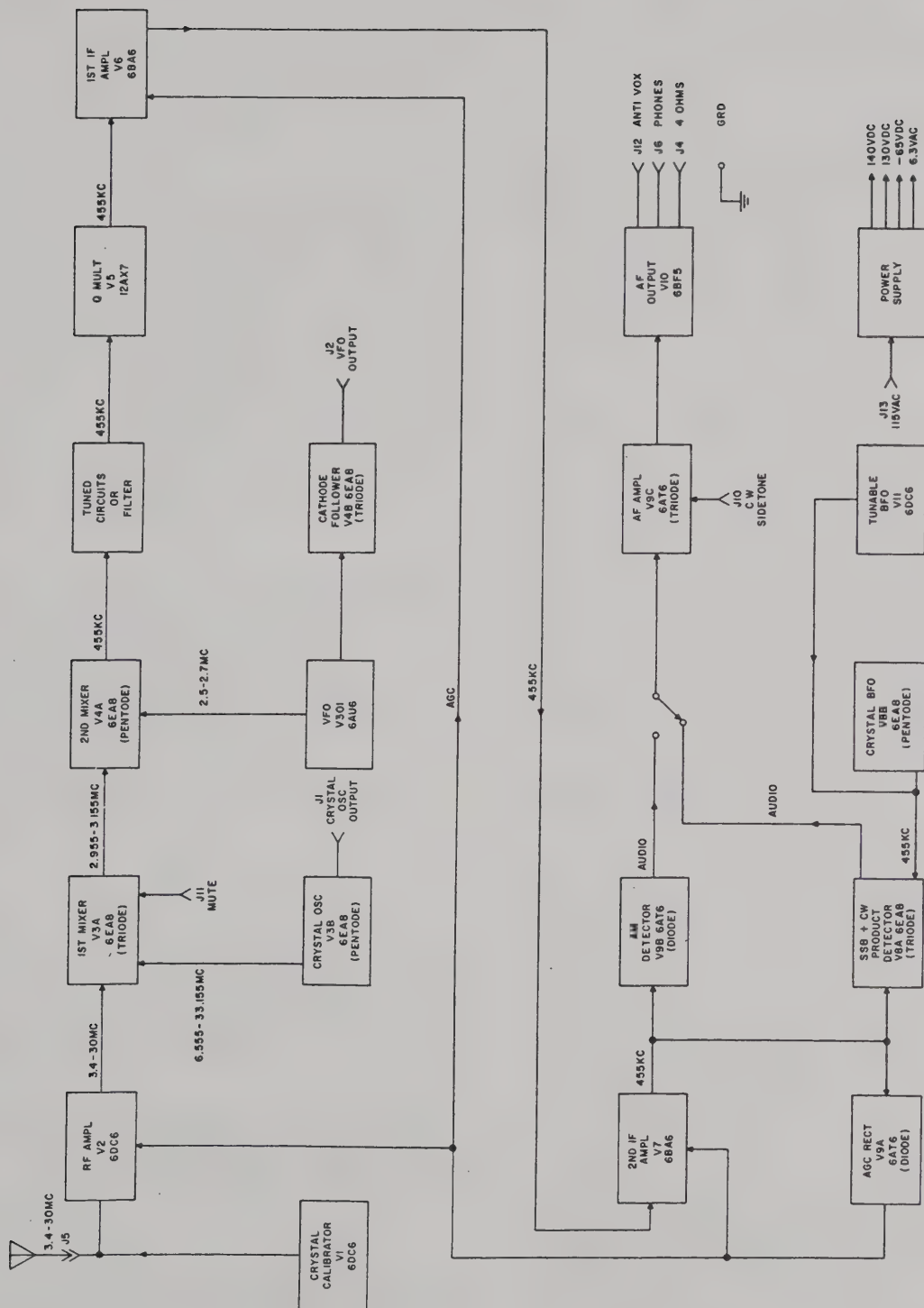


Figure 3-1. Block Diagram





## service instructions

### 4.1 General.

This section covers maintenance and service of 75S-3 and 75S-3A Receivers. It includes information on trouble analysis, signal tracing procedures, voltage and resistance measurements, and alignment procedures. The usefulness of signal level and alignment data given depends upon the accuracy of the test equipment used. Minor adjustments in alignment may be made using the crystal calibrator as a signal source. Except for an occasional touch-up to compensate for possible component aging, alignment normally will be necessary only if frequency-determining components have been replaced. If servicing requires that the cabinet be removed, proceed as follows:

- a. Disconnect all power and external connections.
- b. Lift the lid, and remove the two screws located at the front edge of the cabinet.
- c. Remove the four feet and the screw located midway between the rear feet.
- d. From the rear, push the receiver chassis forward until the front panel protrudes from the cabinet about an inch.
- e. Grasping the front panel at the edges, slide the receiver out of the cabinet.

#### NOTE

DO NOT lubricate the 70K-2 vfo shaft bearings or the dial drive system bearings. The vfo shaft bearings are lubricated at the factory with a special grease. Dial bearings are the Oilite type which are self-lubricating.

Tube filaments and pilot lamps are connected in series-parallel arrangements for 12- or 24-volt operation. When making tube or lamp replacements, be sure that rated filament currents are the same as the original units.

### 4.2 Trouble Analysis.

Most cases of trouble can be traced to defective tubes. Many tube checkers can not duplicate the conditions under which the tubes work in the receiver. Substitution of new tubes will sometimes clear an obscure case of tube trouble. Intermittent trouble conditions in tubes can usually be discovered by lightly tapping the envelope. Occasionally, tube pins or socket terminals will become dirty or

corroded causing an intermittent condition. When this situation is suspected, remove the tube and apply a few drops of contact cleaner to the tube pins. Replace the tube, and work it up and down in the socket a few times. Shorted tubes or capacitors will often cause associated resistors to overheat and crack, blister, or discolor. Making the measurements listed in table 4-1 will help to isolate this type of trouble to a particular stage or component.

A logical process of elimination in conjunction with a study of the main schematic diagram, block diagram, and section 3 will aid in isolating trouble. For example, if the receiver functions properly in the AM position but fails to operate in the SSB or CW positions, trouble in the product detector should be suspected because this circuit is not used for AM reception. As a further check, both beat-frequency oscillators should be alternately switched into the circuit to see if one has failed. A third possibility would be that both beat oscillators have failed.

If the receiver is to be returned to the factory or an authorized service agency, a detailed report of operational difficulties will assist the servicing agency in making repairs with a minimum of time and expense. This is particularly important when intermittent trouble is involved.

### 4.3 Voltage And Resistance Measurements.

Table 4-1 lists typical voltage and resistance readings at each tube socket terminal except those of the vfo tube, V301. Do not open the vfo can. Make all measurements under the following conditions:

- a. Unless otherwise noted in the table, set RF GAIN at maximum, AF GAIN at minimum, EMISSION switch in USB position, function switch in OPR position, tunable bfo off, REJECTION TUNING OFF, and AGC in the FAST position.
- b. Voltage measurements are made with power connected.
- c. Resistance measurements are made with all external cables, including power cable, disconnected. Resistances of less than one ohm are listed as zero.
- d. Make all measurements from indicated socket terminal to chassis ground.

It is recommended that a vtm be used for these measurements. A vom may be used if it has an input resistance of not less than 20,000 ohms per volt. Voltage measurements made with a vom will yield lower readings in high impedance circuits such as the agc line. Do not use a vom for r-f measurements.

SECTION 4  
Service Instructions

TABLE 4-1. VOLTAGE AND RESISTANCE MEASUREMENTS

TUBE	TUBE SOCKET TERMINAL								
	1	2	3	4	5	6	7	8	9
V1 CAL ON DCV CAL OFF DCV ACV OHMS	-52 0 1 MEG	+0.7 52 1000*	0 0	6.3 0	105 142 230K**	51 142 220K**	0 0 0		
V2 DCV ACV OHMS	-0.8 6 MEG	0 0	0 0	6.3 0	138 18K** ①	72 60K**	0 0		
V3 DCV ACV OHMS	112 18K** ①	-11 100K	130 17K** ①	0 0	6.3 0	130 17K** ①	0 0	3.6 1000	0 230K
V4 DCV ACV OHMS	120 18K** ①	0 82	120 18K** ①	6.3 0	0 0	120 19K** ①	4.4 1000	5.4 680	2.7 100K
V5 DCV ACV OHMS	138 18K** ①	-0 100K	1.1 680	0 0	0 0	143 18K** ①	0 340K	1.1 680	6.3 0
V6 DCV ACV OHMS	-0.8 3.7 MEG	0 0	0 0	6.3 0	138 0	74 19K** ①	2.2 22K ①		
V7 DCV ACV OHMS	-0.8 3.6 MEG	0 0	0 0	6.3 0	138 19K** ①	72 23K** ①	0.62 85		
V8 DCV ACV OHMS	46 120K**	-3.2 1 MEG	48 240K**	6.3 0	0 0	112 20K** ①	0 0 ②	0 5	-2.7 5600
V9 DCV ACV OHMS	1.1 680K	2.7 12K	6.3 0	0 0	-0.9 3.5 MEG	0 CW, SB 23 AM ∞ CW, SB 220K AM	100 120K**		
V10 DCV ACV OHMS	-11 250K	0 0	6.3 0	0 0	127 18K** ①	122 18K** ①	-11 250K		
V11 ON DCV OFF DCV ACV OHMS	-2 0 47K	0 25 0 ③	6.3 0	0 0	128 128 20K** ①	30 128 38K**	0 0 0		

\*FUNCTION switch in CAL position

\*\*Resistance may vary depending upon diode and electrolytic condition

① Reverse VOM leads and take highest of the two readings

② Tunable BFO switch OFF

③ Tunable BFO switch ON



TABLE 4-2. SIGNAL LEVELS

SIGNAL INJECTION POINT	GENERATOR OUTPUT FREQUENCY	GENERATOR OUTPUT VOLTAGE	NORMAL INDICATION
V10 - pin 1	1000 cps	5.4 volts	1-watt audio output
V9 - pin 1	1000 cps	0.2 volt	1-watt audio output
V8 - pin 9	455 kc	75 millivolts	1-watt audio output
V8 - pin 6	BFO INJECTION		1.65 volts r-f (each bfo)
V7 - pin 1	455 kc	48 millivolts	Agc threshold
V6 - pin 1	455 kc	175 microvolts	Agc threshold
V4 - pin 6	455 kc	1400 microvolts	Agc threshold
V4 - pin 7	VFO INJECTION		2.0-2.5 r-f volts
V4 - pin 2	3.055 mc	100 microvolts	Agc threshold
V3 - pin 8	HF OSC INJECTION		0.8-2.0 r-f volts
V3 - pin 9	14.1 mc	30 microvolts	Agc threshold
V2 - pin 1	14.1 mc	9 microvolts	Agc threshold
J5 (ANT)	14.1 mc	1.5 microvolts	Agc threshold

#### 4.4 Signal Tracing.

Appropriate test points and normal signal levels are listed in table 4-2. The values listed are nominal. Signal levels in a given receiver may differ from those listed by a factor of plus or minus 20 percent without noticeable degradation in performance. A signal generator with an accurately calibrated output attenuator must be used to provide the r-f signal source voltages indicated. A Hewlett-Packard model 606A or equivalent generator is recommended for this purpose. Be sure to consult the signal generator instruction book for information regarding output termination requirements. Measurements of oscillator injection voltages require the use of an r-f vtvm such as the Hewlett-Packard model 410B. Make r-f and audio measurements under the following conditions:

a. For audio measurements, use an audio oscillator as the signal source and an a-c vtvm or calibrated oscilloscope to monitor receiver audio output. If desired, an audio wattmeter may be used. Set AF GAIN at maximum, and terminate the 4 $\Omega$  AUDIO output with a four-ohm resistive load.

b. Oscillator injection voltages are measured with an r-f vtvm. Measure from cathode to chassis ground at the associated mixer or product detector tube.

c. To check r-f signal levels, connect a d-c vtvm to the receiver agc line. Set RF GAIN at maximum. Static d-c voltage on the agc line should be approximately -1.0 volt. Connect the r-f signal generator to the point indicated in the table, and rock the generator dial to produce maximum agc voltage. Starting from minimum output, increase signal generator output to the point where a further increase in signal produces a slight increase in agc voltage. This is agc threshold. Note generator output voltage, and compare with the value listed in the table.

#### 4.5 Alignment Procedure.

Complete alignment of the receiver may be accomplished using the crystal calibrator as a signal source and the S-meter as a peak indicator. To provide a variable output attenuator for the calibrator, connect a .001-uf capacitor to one end of a 5000-ohm carbon potentiometer. Temporarily connect the free end of the capacitor to tube socket terminal 5 of V1, the crystal calibrator. Connect the rotating contact of the potentiometer to ground. Figure 4-1 shows the location of adjustments except for the filter input and output trimmer capacitors. These trimmers are located under the chassis adjacent to the mechanical and crystal filters. The



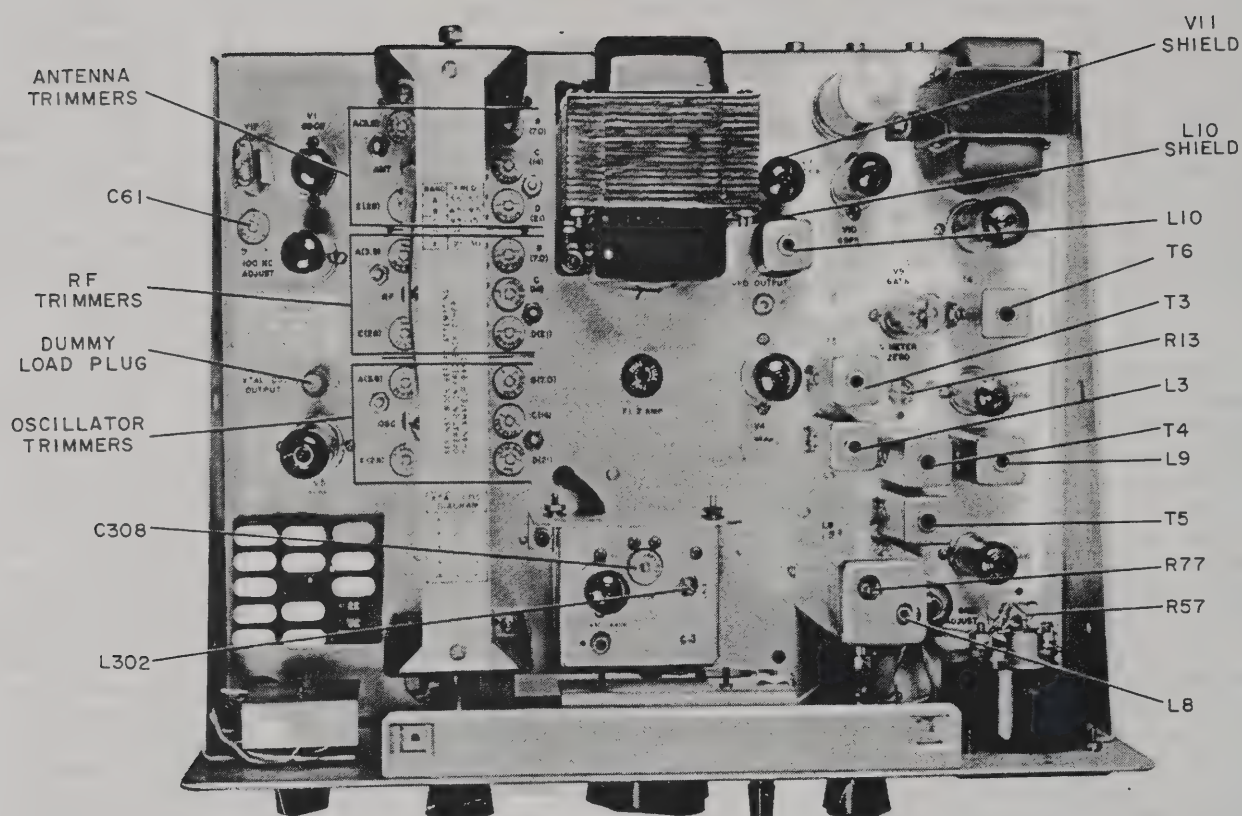


Figure 4-1. Location of Adjustments

rotary ceramic trimmers used in the receiver are at maximum capacity when the large notch is positioned midway between the two mounting screws. Rotation in either direction from this position reduces capacity with minimum being at 180 degrees from maximum.

#### 4.5.1 455-KILOCYCLE I-F ALIGNMENT.

- Set EMISSION switch to USB, and tune to the calibrate signal at 3.7 mc.
- Adjust calibrator output attenuator to provide S-meter reading of approximately S-3.
- Adjust the slugs of L9 and T6 for peak meter reading. Reduce calibrator output as necessary to maintain a low meter reading. Repeat L9 and T6 adjustments.
- Adjust C122 and C123, SSB filter input and output trimmers, for peak meter reading.
- Switch to CW position, and adjust C126 and C127, CW filter input and output trimmers, for

peak meter reading. Rock receiver tuning dial to make sure signal is centered in filter passband.

f. Switch to AM position, and adjust top and bottom slugs of T4 and T5 for peak meter reading. This completes alignment.

g. If a signal generator is used for this alignment, remove vfo tube V301, connect generator to pin 2 of V4, and adjust frequency to center of filter pass band. Align as outlined above, disconnect generator, and replace V301.

#### 4.5.2 BAND-PASS I-F ALIGNMENT.

- Set EMISSION switch to CW, and tune to the calibrate signal at 3.7 mc.
- Make two swamping networks by connecting a .01-uf capacitor in series with a 1000-ohm resistor and connecting alligator clips to the two remaining leads.

c. Connect one swamping network from T3 primary (terminal 1) to ground and the other from L3 (terminal 1) to ground.

d. Adjust attenuator to provide meter reading of approximately S-3.

e. Peak the secondary of T3 (top of can) using a Walsco 2543 or equivalent type tuning tool.

f. Remove both swamping networks and swamp T3 secondary (terminal 3 to ground). Peak T3 primary (bottom of can), and peak L3.

g. Remove swamping network from T3 secondary. This completes band-pass i-f alignment.

h. If a signal generator is used for this alignment, disable the h-f crystal oscillator by removing the crystal for the 3.6-mc band. Connect the signal generator to the XTAL OSC OUTPUT jack, and set to 3.055 mc. Tune receiver to the generator signal at approximately 100 on the dial. Align as above, disconnect generator, and replace crystal.

#### 4.5.3 R-F CIRCUIT ALIGNMENT.

a. Tune to the calibrate signal at 3.7 mc with the EMISSION switch in either USB or LSB position. Connect a 47-ohm resistor or a dummy load such as the DL-1 to the 75S-3/3A ANT jack. During the following procedures, adjust the calibrator output attenuator as necessary to maintain a meter reading of approximately S-3.

b. Set both A (3.8) RF and ANT trimmer capacitors so the large notches point to approximately 2 o'clock when viewed as shown in figure 4-1. Set the A (3.8) OSC trimmer so the large notch points to the rear of the chassis.

c. Set the PRESELECTOR to 2.1 on the logging scale.

d. Adjust the OSC, RF, and ANT slugs located on the movable platform the maximum S-meter indication. Adjust the OSC slug first. After making these adjustments, make sure the PRESELECTOR tuning peaks at 2.1 on the logging scale.

e. Set BAND switch to 28A, PRESELECTOR to 8.9 on the logging scale, and tune to the calibrate signal at 28.6 mc. Maintain S-3 signal level.

f. Adjust E (28) OSC, RF, and ANT trimmer capacitors for peak S-meter reading. Adjust OSC trimmer first.

g. Set BAND switch to 21.0 and PRESELECTOR to 7.9 on the logging scale. Tune to calibrate signal at 21.1 mc. Maintain S-3 signal level.

h. Adjust D (21) OSC, RF, and ANT trimmers for peak S-meter reading. Adjust OSC trimmers first.

i. Set BAND switch to 14.8 and PRESELECTOR to 7.0 on the logging scale. Tune to calibrate signal at 14.9 mc. Maintain S-3 signal level.

j. Adjust C (14) OSC trimmer for peak S-meter reading.

k. Set BAND switch to 14.2 and PRESELECTOR to 6.6 on the logging scale.

l. Adjust C (14) RF and ANT trimmers for peak meter reading. Maintain S-3 signal level.

m. Set BAND switch to 7.0 and PRESELECTOR to 3.9 on the logging scale. Tune to calibrate signal at 7.1 mc. Maintain S-3 signal level.

n. Adjust B OSC, RF, and ANT trimmers for peak S-meter reading. Adjust OSC trimmer first.

o. Disconnect the crystal calibrator output attenuator. This completes r-f alignment.

p. If signal generator and r-f vtm are used for this alignment, connect the generator output to the receiver ANT jack. Set generator output to frequencies listed, and align RF and ANT trimmers as outlined in preceding steps. Connect r-f vtm to XTAL OSC OUTPUT jack on bottom side of chassis, leaving load plug P1 in place. Align OSC trimmers as indicated except adjust for peak reading on the vtm. In step k, adjust PRESELECTOR near 6.6 on logging scale at the point where vtm reading peaks.

#### 4.5.4 VFO SIDEBAND FREQUENCY SHIFT ADJUSTMENT.

Set EMISSION switch to LSB, and tune to zero beat with calibrate signal at 3.7 mc. Without further movement of the dial, switch to USB, and adjust C308 (on vfo) for zero beat.

#### 4.5.5 CRYSTAL CALIBRATOR ADJUSTMENT.

a. Set receiver for AM reception, and tune to WWV at 15.0-mc at a time when the station is not transmitting tone.

b. Turn function switch to CAL position. Set 100 KC ADJUST trimmer C61 for zero beat of the calibrate signal against WWV.

#### 4.5.6 VFO DIAL CALIBRATION.

Calibrate the dial at 100. If zero beat with the calibrate signal does not occur at 0 and 200 +1 kc on the dial, there is end-point spread. If there is no end-point spread, but the hairline is not vertical when the dial is calibrated, a mechanical adjustment only is required. Refer to step h in the following procedure. To correct for end-point spread, make the following adjustments:

a. Set BAND switch to any band and function switch to CAL, and tune calibrate signal to zero beat at 200 end of the dial.

b. Set hairline to 200 with zero set knob.

c. Tune calibrate signal to zero beat at 0 end of the dial. Note the difference in kilocycles between the hairline and dial 0 (example: -1.5 kc).

d. Without moving the hairline, move the dial to the opposite side of 0 by an amount equal to the frequency difference noted above (example: +1.5 kc).

e. Adjust L302 for zero beat. It is located on top of the vfo can.

f. Set the hairline at 0 with zero set knob.

g. Tune the calibrate signal to zero beat at the 200-end of the dial. If zero beat does not occur at exactly 200, repeat steps b through e.



## SECTION 4

### Service Instructions

h. After adjustment of end points, if the hairline is not vertical in the dial window, loosen the set-screws on the dial hub, and move the dial relative to the oscillator shaft so that, at zero beat, the dials reads 0 to 200 with the hairline vertical.

i. After these adjustments of the vfo calibration, make the vfo sideband frequency shift adjustment as outlined in paragraph 4.5.4.

#### 4.5.7 TUNABLE BFO ALIGNMENT.

a. Make sure the BFO tuning knob is correctly positioned on the shaft. At the control end stops, the knob pointer should be at approximately 7 o'clock (ccw end) and 5 o'clock (cw end).

b. Rotate BFO knob to extreme counterclockwise. Turn on calibrator and tune receiver to zero beat in USB position.

d. Turn on tunable bfo, and set BFO knob to 0.

e. Adjust L10 for zero beat.

#### 4.5.8 NOTCH FILTER ALIGNMENT.

a. Check REJECTION TUNING knob position. Pointer should be at OFF when the knob is at the counterclockwise stop. Leave at OFF position.

b. Tune to the calibrate signal on a band which provides a calibrate signal level of approximately S-9 plus

20 db in either USB or LSB position. Center signal in filter passband (approximately 1350-cps tone).

c. Set REJECTION TUNING knob to midscale (pointer vertical).

d. Alternately adjust L8 and R77 for maximum depth of notch as indicated by minimum S-meter reading. If the Q-multiplier exhibits a tendency to ring or oscillate, back off slightly on R77.

#### 4.5.9 I-F GAIN ADJUSTMENT.

To set i-f gain control R57, a signal generator with a calibrated output attenuator is required. Connect the signal generator to the receiver ANT jack, and adjust to 1.5 microvolts output at 28.6 mc. Tune the receiver to the generator signal, and adjust R57 to the point which produces a just-perceptible increase above the no-signal reading on the S-meter. Do not make this adjustment until receiver alignment has been completed.

#### 4.5.10 S-METER ZERO ADJUSTMENT.

a. Set receiver to the middle of any operating band, and peak PRESELECTOR for maximum output.

b. Set RF GAIN to maximum, and short ANT jack to ground.

c. Set S-METER ADJUST (R13) so S-meter reads zero.

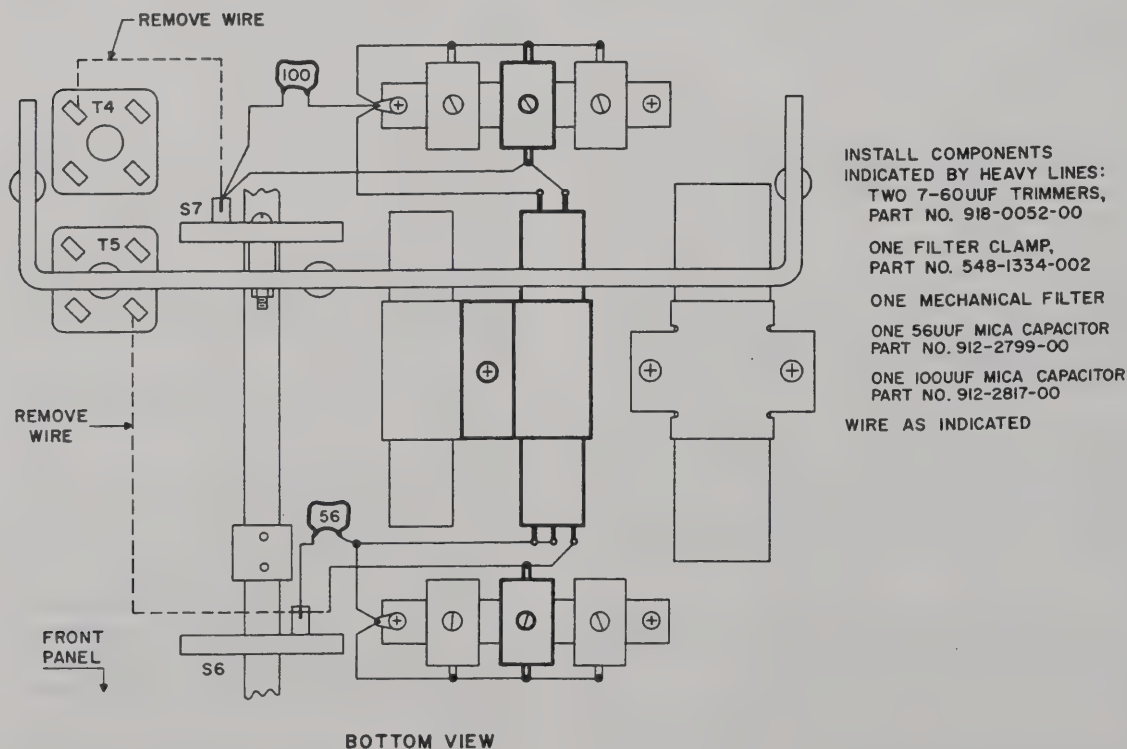


Figure 4-2. Optional Filter Installation Diagram



#### 4.6 Installation of Optional Filters.

Space is provided in the 75S-3/3A to install accessory filters in place of the 455-kc transformers used in the AM function. Figure 4-2 shows the placement of parts and required wiring changes.

To obtain access to the front trimmer-mounting strip, remove the long strip located behind the front panel and fastened by machine screws to the brackets for the front cabinet feet. Bend the mounting tabs on the new trimmer capacitors slightly toward each other, snap the trimmers into place on the trimmer-mounting strips, and solder the appropriate lugs to the ground buses as shown in figure 4-2. Install the filter as shown. If necessary, bend the new filter

clamp slightly to provide a good fit around the filter. One end of the filter has three terminals, one of which has no insulation around it. This is the case ground. Connect this terminal and either one of the two remaining terminals to chassis ground. Either of the terminals on the opposite end of the filter may be used for the ground connection indicated. Dress the new wiring carefully to prevent shorts. Where needed, use spaghetti from removed wiring.

When installation and wiring are completed, turn the receiver on, and tune to the calibrate signal at 14.0 mc. Adjust the filter trimmer capacitors for maximum S-meter reading with the signal centered in the filter passband. Available filters and installation kit of parts are listed in table 5-2.



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section **1**

## installation

**1.1 Unpacking.**

Lift the receiver out of the carton and packing material. Examine for visible damage. If the receiver has been damaged in shipment, save the box and packing material, and notify the transportation company. Complete and mail the equipment registration card. Check tubes and crystals for proper seating in sockets. Check tuning controls and switches for freedom of action. Check that the special Mu-Metal shields are in place on tube V11 and coil L10 (see figure 4-1). Check the equipment included with the receiver against table 1-1.

**1.2 Cabling.**

**1.2.1 EXTERNAL CONNECTIONS.** Figure 1-1 shows the location of jacks for external connections to 75S-3 and 75S-3A receivers. The power cable plugs into socket J13. The ANT jack is a nominal 50-ohm antenna input. The 4  $\Omega$  AUDIO jack is for connection of a speaker.

**CAUTION**

DO NOT connect the a-c power cord to the 115-volt a-c line until power plug P6 has been plugged into J13. To avoid damage to the receiver, make sure the key on P6 is properly aligned with the keyway on J13.

To connect the receiver for mute operation, a means of supplying a ground while receiving must be applied to the MUTE jack. Opening this circuit mutes the receiver. A set of normally closed contacts on a relay which is keyed with the transmitter may be used for this purpose. To use this circuit, the receiver must be operated in the STBY position.

The CW SIDETONE jack is a high-impedance, low-level audio input (0.2 volt rms, typical) to the receiver. Audio from a sidetone oscillator may be applied to this

TABLE 1-1. EQUIPMENT FURNISHED WITH 75S-3/3A

QUANTITY	DESCRIPTION	FUNCTION	PART NUMBER
2	Phono-type connectors	External connections	361-0062-00
1	Fuse, 2-ampere	Spare	264-4070-00
1	Power cord	A-c power	544-3121-00
1	Power plug adapter	A-c power	368-0138-00
1	Instruction book	75S-3/3A instructions	523-0148-00
1	Logbook	Station logging	523-0755-820
1	Cable marker card	Cable identification	280-2946-00
1	No. 4 Bristo wrench	Accessory tool	024-2900-00
1	No. 6 Bristo wrench	Accessory tool	024-9730-00
1	No. 8 Bristo wrench	Accessory tool	024-0019-00
1	No. 10 Bristo wrench	Accessory tool	024-9710-00

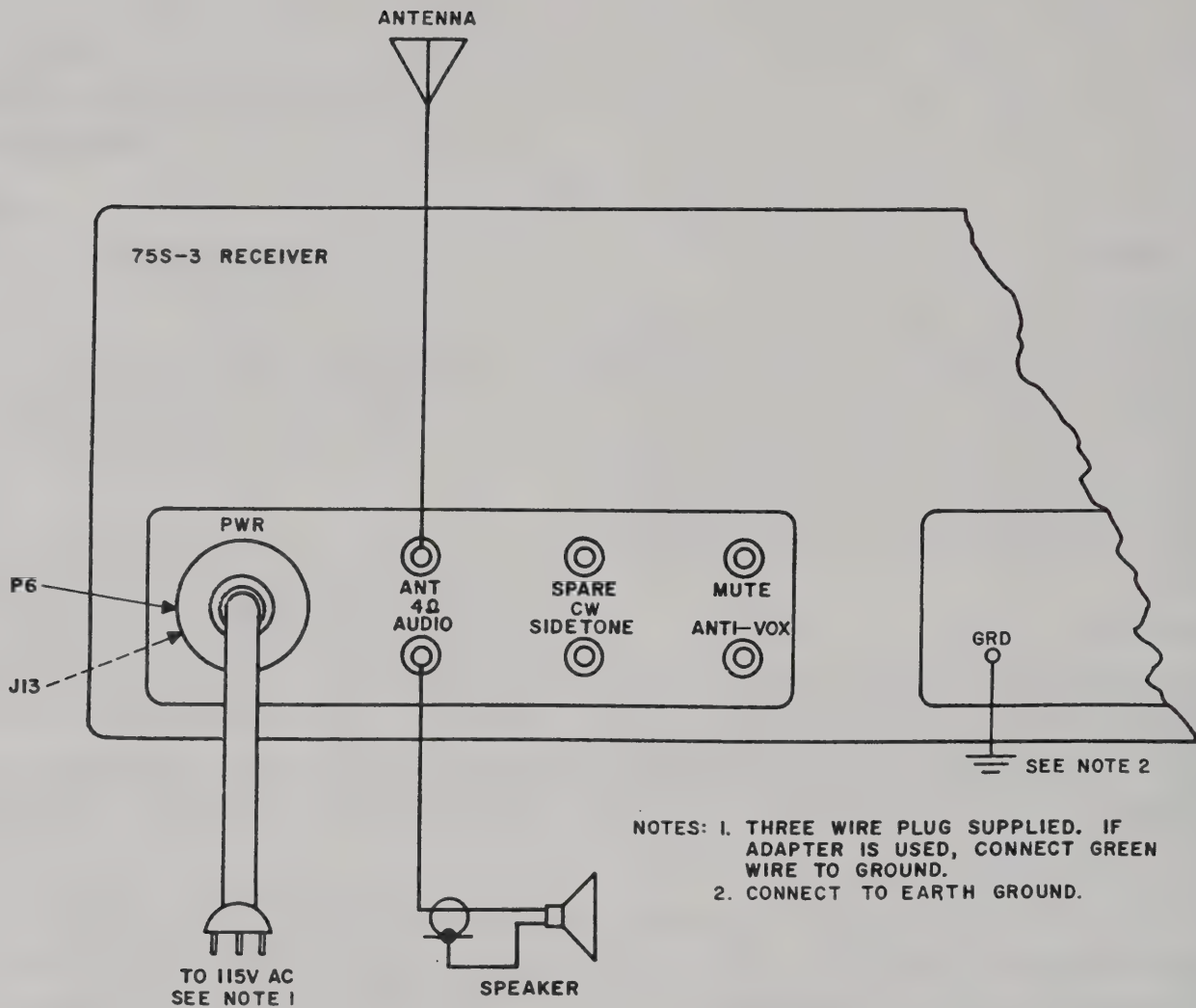


Figure 1-1. External Connections

jack to provide a cw monitoring circuit through the receiver audio system.

The ANTI-VOX jack is a 500-ohm audio output from the receiver. At normal speaker volume levels, 5 to 10 volts rms is provided at this output. This voltage is normally applied to anti-vox circuits in an associated transmitter.

The PHONES jack on the front panel is connected through a resistive network to a 500-ohm tap on the output transformer. Therefore, best results will be obtained if headphones used are 500 ohms or higher impedance. The speaker is silenced when headphones are plugged in.

**1.2.2 CABLING WITH 32S-3 TRANSMITTER.** Figure 1-2 shows a complete station interconnection for a 75S-3 or 75S-3A Receiver, 32S-3 Transmitter, and

312B-4 Station Control. The RG-58C/U cables indicated are slightly larger in diameter and two inches shorter than the audio and control cables. If the 312B-4 is not used, connect a 4-ohm speaker, such as the 312B-3, to 4 Ω AUDIO jack on receiver. Connect ANTI-VOX jack on receiver directly to ANTI-VOX jack on transmitter. Omit PHONE PATCH and PTT connections.

To connect the 75S-3 or 75S-3A and the 32S-3 for transceiver operation, use the patch cables furnished with the transmitter, and connect as follows:

- a. Connect the 32S-3 and 75S-3/3A as shown in figure 1-2.
- b. Remove P1 from XMTR XTAL OSC jack J7 (under 32S-3 top cover), and plug it into 32S-3 RCVR XTAL OSC jack J6. Remove the 100-ohm dummy load plug from the 75S XTAL OSC OUTPUT jack, and plug it into 32S-3 XMTR XTAL OSC jack J7.



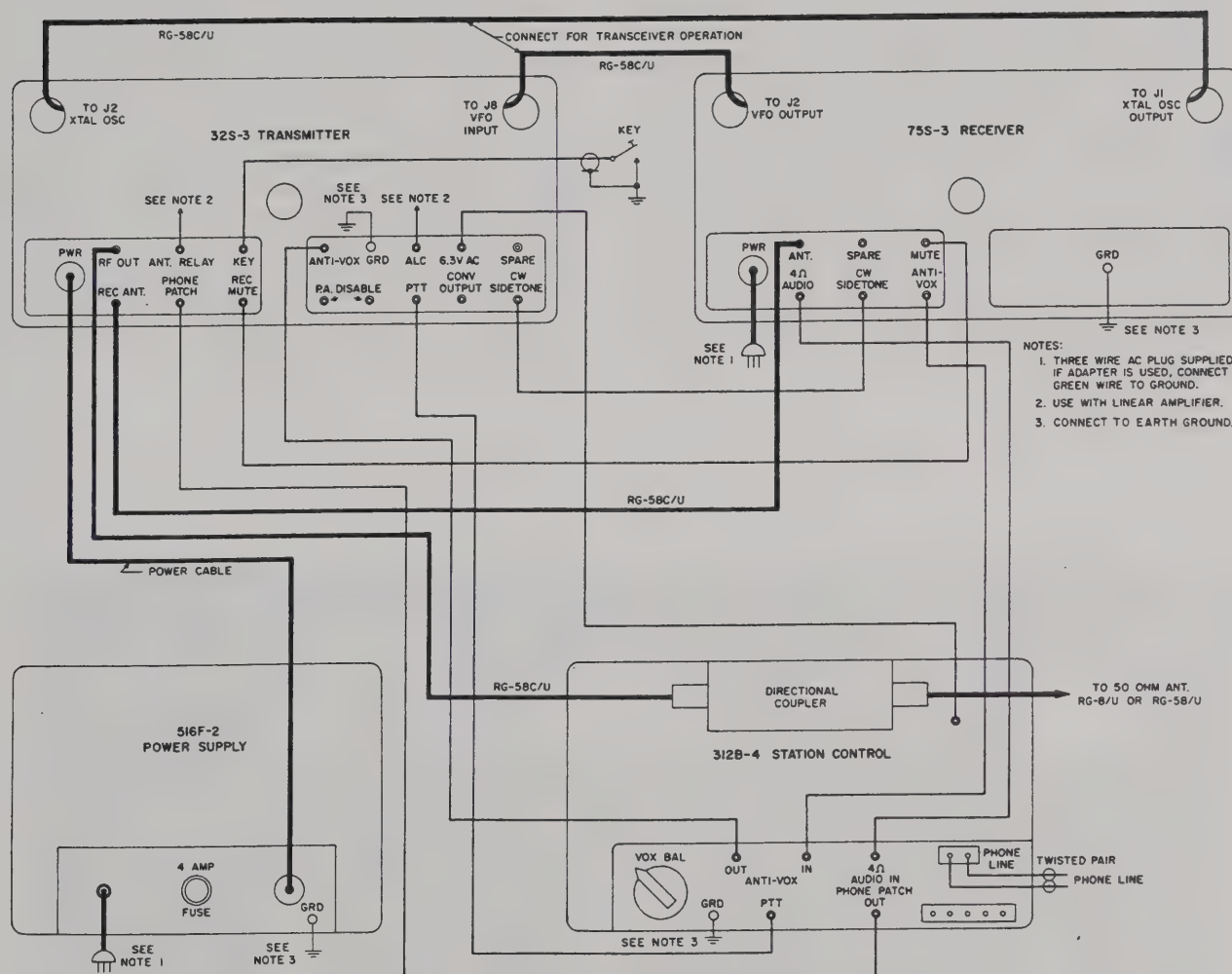


Figure 1-2. Station Interconnections

## SECTION 1

### Installation

**1.2.3 CABLING WITH KWM-2/2A TRANSCEIVER.**  
The 75S-3/3A may be used with a KWM-2/2A to provide separate transmit and receive frequencies. Connect the patch cables as follows:

- a. Using an RG-58C/U patch cable, connect REC ANT jack on KWM-2/2A to ANT jack on 75S-3/3A.
- b. Connect the 500  $\Omega$  jack on the KWM-2/2A to the ANTI-VOX jack on the 75S-3/3A. If a 312B-4 or 312B-5 is used, connect the KWM-2/2A 500 $\Omega$  jack to ANTI-VOX IN and the 75S-3/3A ANTI-VOX jack to ANTI-VOX OUT on the 312B-4/5.
- c. Connect the REC MUTE jack J20 on the KWM-2/2A to the MUTE jack on the 75S-3/3A.

The station speaker may be plugged into either the 4  $\Omega$  jack on the KWM-2/2A or the 4  $\Omega$  AUDIO jack on the 75S-3/3A. For normal mute operation, set the 75S-3/3A function switch to STBY. Receiver output from the KWM-2/2A is turned off by setting AF GAIN to zero. For transmit and receive operation on the same frequency, reduce the 75S-3/3A AF GAIN to zero, and operate the KWM-2/2A in a normal manner.

### 1.2.4 CABLING WITH OTHER TRANSMITTERS.

- a. To provide receiver muting when using 75S-3/3A with KWS-1, connect a cable from pins 5,6 on J102 (receiver disable) in the transmitter to MUTE jack on the receiver. Connect a cable from receiver ANTI-VOX jack to pin 7 on J102 (500-ohm audio) in the KWS-1. Connect cable shield to ground.
- b. To use the 75S-3/3A with the 32V-3, connect a cable from the receiver MUTE jack to receiver disabling pins 24 and 25 on the transmitter.
- c. To use the 75S-3/3A with other makes of transmitters, connect muting, cw sidetone, and anti-vox provisions in the receiver as applicable. The requirements for use are outlined in paragraph 1.2.1.

### 1.3 Initial Checks.

Lift the top cover, and make sure the dummy load (see figure 4-1) is plugged into the XTALOSC OUTPUT jack unless the receiver is connected for transceiver operation. Recheck the interconnections to make sure the patch cables are plugged into the appropriate jacks. Be sure that RG-58C/U cables, rather than the audio and control cables, have been used for all r-f applications. Check to ensure the special Mu-Metal shields are in place on tube V11 and coil L10.

# section 2

## operation

### 2.1 Calibration.

- After making external connections, set controls as shown in figure 2-1.
- Set BAND switch (11) to desired frequency range. If receiver is 75S-3A, set crystal board selector (10) so desired set of bands appears in window.
- Set dial to 0, 100, or 200 with tuning knob (3).
- Adjust PRESELECTOR (2) for maximum signal or noise output.
- Tune back and forth near 0, 100, or 200 until calibrate signal is at zero beat.
- Adjust zero set knob (4) until dial is calibrated.

### 2.2 Single-Sideband Tuning.

- Set controls as shown in figure 2-1, except set function switch (1) to OPR, and the BFO knob fully counterclockwise until a click is heard.
- Set EMISSION switch (12) to desired sideband.
- Adjust PRESELECTOR (2) for maximum signal or noise output.
- Tune in signal and adjust AFGAIN (9) for desired audio output level.

When listening to strong signals, a reduction in background noise under no-modulation conditions may be

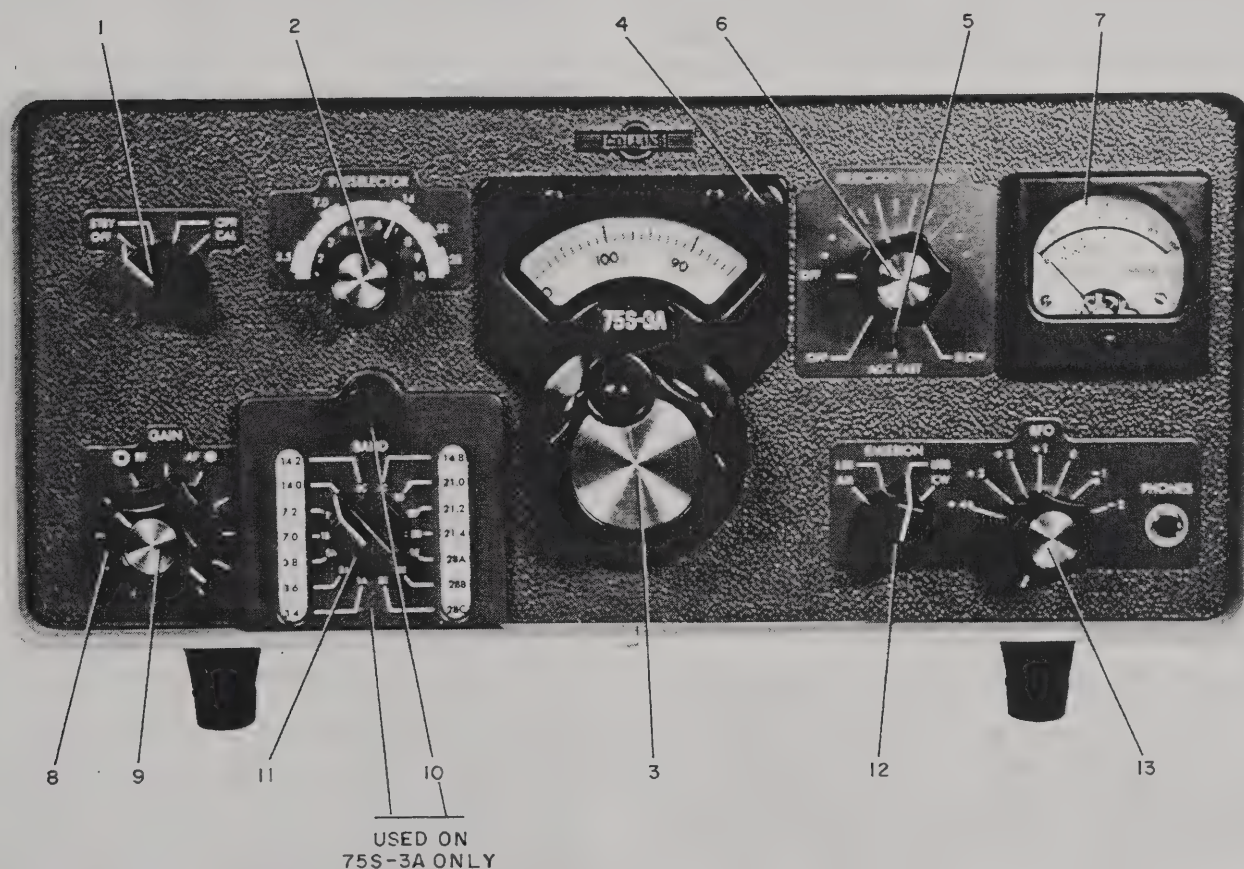


Figure 2-1. Operating Controls



## SECTION 2

### Operation

obtained by rotating RF GAIN control (8) counterclockwise, away from the maximum position. As this is done, S-meter (7) static reading will shift upscale. At proper gain control setting, meter will kick about one or two S-units on peaks. For example, if the weakest of the desired signals is peaking at S-9, set gain control so that static meter reading is S-7 to S-8. This retains accurate meter readings.

To read frequency, add the dial setting to the BAND switch setting. For example, if the BAND switch is set to 3.8 and the dial is set to 5, the frequency is 3.805 mc. If the BAND switch is set to 3.8 and the dial to 170, the frequency is 3.970 mc.

### 2.3 CW Tuning.

a. Set controls as outlined in paragraph 2.2 except set EMISSION switch to CW.

b. Rotate the BFO knob (13) clockwise to energize the tunable bfo. Set to either +1 or -1.

c. Adjust BFO knob to yield the most pleasing beat note with the desired signal centered in the filter pass band.

d. Read approximate frequency as follows: When BFO knob is set to the plus side of zero, add kilocycle reading from bfo scale to dial reading. Subtract bfo reading for minus settings of the knob. If a precision reading is desired, set the BFO knob, and recalibrate the main tuning dial using the crystal calibrator. When the main dial is calibrated in this manner, further adjustment of the BFO knob or switching to the crystal-controlled BFO requires recalibration of the dial.

Either fast or slow AGC (5) may be used, or it may be turned off. If AGC is turned off, decrease RF GAIN control setting to prevent receiver overloading. Adjust AF GAIN control to provide desired audio level. In general, it is best to set r-f gain at a point just below that which causes signal to overload receiver. This provides optimum sensitivity.

Tuning may be facilitated by switching first to USB to tune in the desired signal and then switching to CW to reduce interference. The beat note will be the same in either position. The wider pass band provided in USB is also useful for net operation.

### 2.4 AM Tuning.

a. Set controls as outlined in paragraph 2.2.

b. Set EMISSION switch to AM.

c. Set AGC switch to FAST.

d. Tune in signal, and adjust AF GAIN for desired audio output level.

If desired, SSB methods may be used for AM reception. Set EMISSION switch to either USB or LSB position; use tuning procedure for a single-sideband signal. Once the desired signal is tuned in, switching to the opposite sideband may yield a more readable signal. This method of reception is useful under conditions of severe interference or extreme fading.

### 2.5 RTTY Tuning.

This type of operation requires an external RTTY converter and printer. Tune receiver as follows:

a. Set controls for SSB reception as outlined in paragraph 2.2 with EMISSION switch in USB position.

b. Turn on tunable bfo by rotating BFO knob (13) clockwise.

c. Set the pointer on the BFO tuning knob at the dot near -1 on the calibrated scale.

d. Tune the receiver for maximum S-meter reading on the desired RTTY signal.

e. Fine adjustment of the BFO tuning knob then will produce 2125 cps and 2975 cps mark and space signals at the receiver audio output. To reverse the mark and space signals, reset the BFO tuning knob to the dot near +4 on the calibrated scale.

### 2.6 Rejection Tuning.

An interfering heterodyne or cw signal may be reduced in level or eliminated by operation of the REJECTION TUNING knob (6). The off position for this control is at the end of extreme counterclockwise rotation. The on-off switch is provided with a positive stop rather than a detent. Do not force the knob. Clockwise rotation of the knob from the off position moves the rejection notch across the receiver pass band. It is recommended that the operator familiarize himself with the operation of this control by tuning the notch across the signal from the crystal calibrator.

When the receiver is initially placed in operation, it may be necessary to touch up the adjustment of R77. Refer to paragraph 4.5.8.

### 2.7 Use of S-Meter.

The S-meter is intended primarily to indicate relative rather than absolute signal strength. A nominal meter reading of S-9 is obtained with an input signal of 100 microvolts. The threshold of agc operation is set at the factory to a nominal value of 1.5 microvolts. Due to normal tolerances in receiver operation, agc threshold varies slightly from band to band causing correspondingly slight changes in the number of db represented by each S-unit. The db scale is calibrated with 1 microvolt as a reference; therefore, an S-9 signal of 100 microvolts represents a 40-db increase over the reference signal level. Since agc is not applied to very weak signals, S-zero is arbitrarily established at 10 db on the scale. Typical meter readings, therefore, can represent from 3.3 to slightly over 4 db per S-unit. A figure of 4 db can be taken as an average.

### 2.8 Transceiver Operation with 32S-3 Transmitter.

a. Make sure patch cables are connected as outlined in paragraph 1.2.2.

b. Set FREQ CONTROL (1) on 32S-3 to REC VFO position.

c. Set OFF-STBY-OPR-CAL switch on 75S-3/3A to STBY position.

d. Set both BAND selectors to the same desired band and both EMISSION switches to the same position (either USB, LSB or CW).

e. Tune both receiver and transmitter as in normal operation. Both transmit and receive functions operate from the receiver vfo; the transmitter vfo is not used

in transceiver operation. Switching the transmitter FREQ CONTROL (1) back to TRANS VFO position will allow separate operation of the two units within the same 200-kc band.

## NOTE

In CW transceiver operation, the 75S variable bfo will have to be used to obtain the desired beat note if it is desired to transmit zero beat with another station.

**CAUTION**

When operating in transceiver service, do not operate the transmitter while the receiver is tuned outside band limits; the transmitted signal will be out of the band. Do not attempt operation with receiver and transmitter set on different 200-kc bands, even when operating in TRANS VFO position. With patch cables connected for transceiver operation, the receiver h-f crystal oscillator controls injection frequency to the transmitter second mixer.

If operation on different 200-kc bands is desired (that is, receive on one 200-kc band and transmit on another), remove the transceiver patch cables and operate the units as in normal independent operation.

If transmitted frequency is changed by any great amount, be sure to redip the PA plate current and check the loading. This will be most important on the 80- and 40-meter bands.

Some operating experience will indicate the amount of frequency excursion possible without readjustment.

Do not attempt operation in transceiver service with any other receiver not having the same frequency mixing scheme.

f. To restore both units to normal operation, remove the two patch cables connecting oscillator signals, replace P1 in J7 on the transmitter slug rack (under top cover), and replace the 100-ohm load plug in the receiver XTAL OSC OUTPUT jack.

**2.9 Operation Outside Amateur Bands.**

Additional 10-meter band coverage, or coverage outside the amateur bands may be obtained by plugging an appropriate crystal into the crystal mounting board. Two extra sockets are provided in the mounting board for this purpose. The total 3.4- to 30.0-megacycle coverage available is divided into five segments, designated A, B, C, D, and E. The frequency range of each of these segments is listed in the total coverage column of table 2-1. The letter portions of the crystal socket locations shown in figure 2-2 indicate which sockets may be used for crystals to cover a 200-kc band within a specific total coverage segment. For example, crystals for extended 10-meter coverage must be plugged into sockets marked E.

The proper crystal for coverage of a specific 200-kc band may be selected as follows:

a. If the lower edge of the desired band is 11.8 mc or less, the required crystal frequency is equal to the

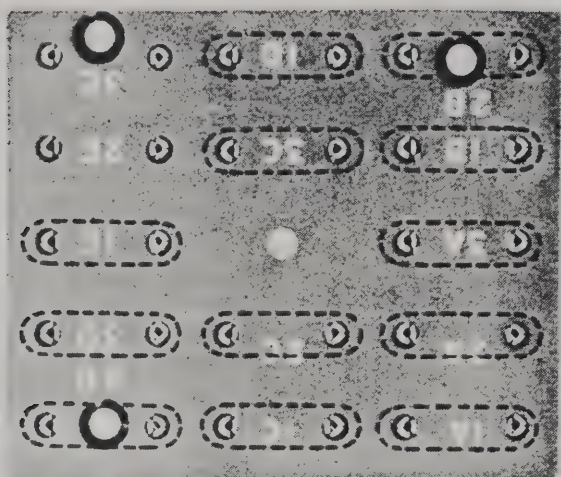
TABLE 2-1. CRYSTAL FREQUENCIES AND OPERATING BANDS

BAND-SWITCH POSITION	FREQUENCY BAND	CRYSTAL SUPPLIED	CRYSTAL SOCKET CONNECTED	TOTAL COVERAGE
1A - 3.4 2A - 3.6 3A - 3.8	3.4 - 3.6 mc 3.6 - 3.8 mc 3.8 - 4.0 mc	6.555 mc 6.755 mc 6.955 mc	1A 2A 3A	A 3.4 - 5.0 mc
1B - 7.0 2B - 7.2	7.0 - 7.2 mc 7.2 - 7.4 mc	10.155 mc 10.355 mc	1B 2B	B 6.5 - 9.5 mc
1C - 14.0 2C - 14.2 3C - 14.8	14.0 - 14.2 mc 14.2 - 14.4 mc 14.8 - 15.0 mc	8.5775 mc 8.6775 mc 8.9775 mc	1C 2C 3C	C 9.5 - 15.0 mc
1D - 21.0 2D - 21.2 3D - 21.4	21.0 - 21.2 mc 21.2 - 21.4 mc 21.4 - 21.6 mc	12.0775 mc 12.1775 mc 12.2775 mc	1D 2D 3D	D 15.0 - 22.0 mc
1E - 28A 2E - 28B 3E - 28C	28.5 - 28.7 mc As selected As selected	15.8275 mc Not supplied Not supplied	2E 2E 3E	E 22.0 - 30.0 mc



## SECTION 2

### Operation



### Figure 2-2. Crystal Socket Locations

lower edge of the desired band plus 3.155 mc. For example, if the desired band is 4.0 to 4.2 mc, the required crystal frequency is 7.155 mc.

b. If the lower edge of the desired band is 12.0 mc or higher, the required crystal frequency is equal to half the sum of the desired lower band edge and 3.155 mc. For example, if the desired band is 14.4 or 14.6 mc, the required crystal frequency is 8.7775 mc.

Extra crystals available are listed in section 6, Parts List.

Approximate settings for the PRESELECTION are shown in figure 2-3. For example, if coverage from 10.0 to 10.2 mc is desired, plug the appropriate crystal into a socket marked C, turn the BAND switch to that position, and set the PRESELECTOR to approximately 3.2 on the logging scale. Peak the PRESELECTOR tuning as in normal operation. The ANT, RF, and OSC trimmer capacitors (those marked C in the example above) may also be peaked if optimum performance is desired at frequencies outside the amateur bands. On some bands it is possible to peak the PRESELECTOR tuning at an image frequency or at a different order of output frequency from the crystal oscillator; however, there is only one correct setting for coverage within a given 200-kc band.

The above information also applies to the 75S-3A except that two crystal mounting boards are provided in this receiver. The amateur-band board is located under the chassis. To obtain access, refer to paragraph 4.1. When crystal board selector (10) is switched to extended coverage position, the above-chassis board is switched into the circuit. The crystal socket locations are the same for both boards. Space is provided in the window adjacent to the BAND switch to mark in-band information. A pencil may be used to allow erasure if changes are made.

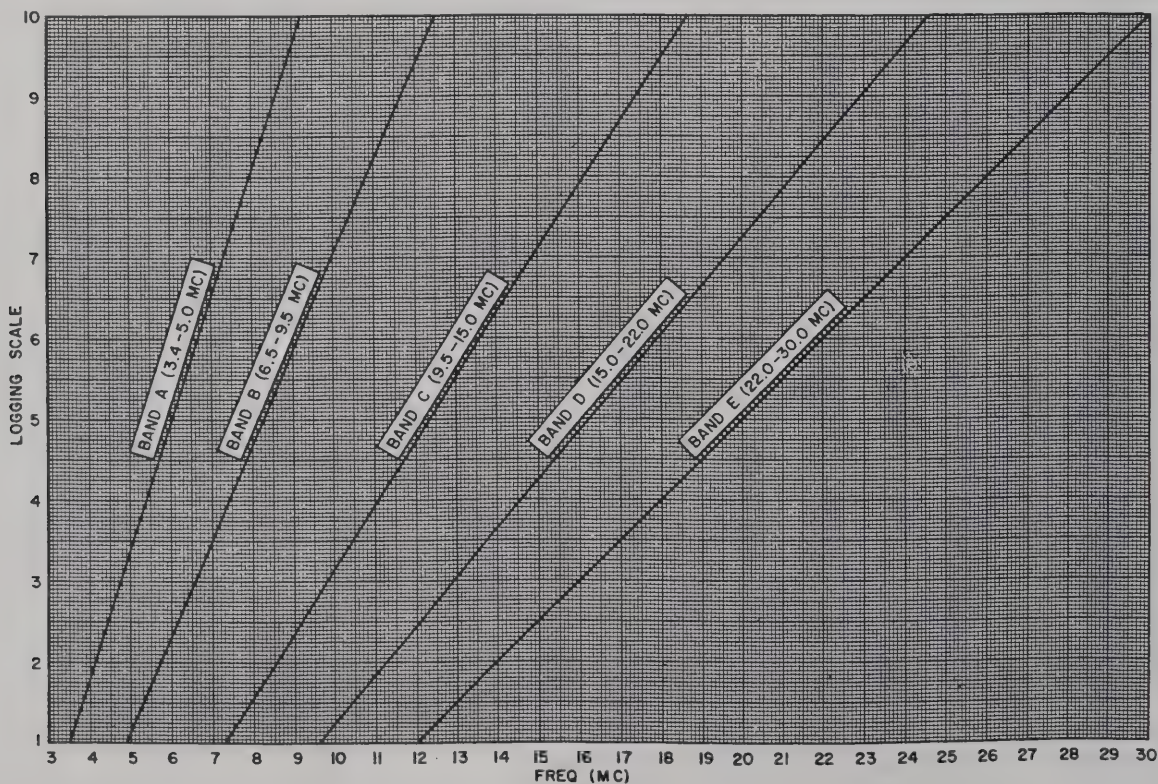


Figure 2-3. Preselector Calibration Curves



## principles of operation

### 3.1 Block Diagram.

Figure 3-1 is a block diagram for 75S-3 and 75S-3A Receivers. Double conversion is used, with injection voltage for the first conversion provided by a crystal-controlled oscillator. A band-pass i-f, 200 kilocycles wide, is used to couple the first and second mixers. Injection voltage for the second mixer is furnished by a vfo with a tuning range of 200 kc. The 455-kc output frequency of the second mixer is coupled through the i-f system to separate AM and SSB detectors. Injection voltage for the product detector is provided by either a crystal-controlled bfo or a tunable bfo. The 75S-3A is identical to the 75S-3 except that it is equipped with an extra h-f crystal mounting board on the chassis, a crystal board selector switch on the front panel, and associated components. Figure 7-1 is a schematic diagram for both receivers, with circuit differences noted.

### 3.2 R-F and Mixer Circuits.

The r-f amplifier grid, high-frequency mixer grid, and crystal oscillator plate circuits are resonated by slug-tuned coils. The slugs are mechanically ganged and linked to the PRESELECTOR tuning knob. The required tuning ranges of these circuits are obtained by switching appropriate values of fixed capacitance in parallel with the coils. The total 3.4- to 30-mc tuning range of the receiver is divided into five segments for band-switching purposes, as noted in table 2-1. The tuned circuit LC ratio is thereby varied within appropriate limits for each of the five segments.

Signals within the particular 200-kc band selected are amplified by V2, the r-f amplifier, and coupled to the control grid of V3A, the first mixer. Injection voltage is coupled to the cathode of V3A. Products of mixing are selected in the plate circuit of V3A, tuned to 3.155 to 2.955 mc which is the band-pass i-f frequency. Signals are coupled to the control grid of second mixer V4A with vfo injection voltage applied to the cathode of this tube.

### 3.3 Oscillator Circuits.

**3.3.1 CRYSTAL OSCILLATORS.** High-frequency crystal oscillator V3B provides injection voltage for the first mixer. The crystal oscillator output frequency is always 3.155 mc higher than the lower edge of the selected band. On bands below 12.0 mc, the oscillator plate circuit is tuned to the crystal frequency. At 12.0 mc and higher, the plate circuit is tuned to the second harmonic. The secondary winding of T2 couples injection voltage to the first mixer cathode circuit and furnishes a d-c return

to ground for mixer tube V3A. Dummy load R41 stimulates the load presented by the 32S-3 Transmitter when connected for transceiver operation.

Crystal-controlled bfo V8B and associated circuitry furnishes injection voltage for the product detector. Crystals Y15 and Y16 provide the proper bfo frequency relationships to the mechanical filter passband to yield optimum audio response from the product detector. Crystal Y15 is used for lower sideband reception, and Y16 is used for upper sideband. Capacitor C95 and coil L-12 form a broadly resonant circuit at 455 kc. Oscillator voltage is developed across R49 and coupled by C100 to the cathode of V8A, the product detector tube.

The crystal calibrator circuit provides marker signals at multiples of 100 kc. Variable capacitor C61 provides for adjustment to zero beat with WWV. The output of this oscillator is coupled to the receiver antenna circuits.

**3.3.2 VARIABLE OSCILLATORS.** The vfo uses fixed capacitance and variable inductance to produce the required tuning range of 2.5 to 2.7 mc. Capacitor C303, in the frequency-determining network, is paralleled by variable capacitor C308 in series with diode CR301. This diode switches C308 in or out of the circuit, depending upon the polarity of a bias voltage impressed across the diode junction. The bias voltage is coupled to the diode through R303, and is positive in the USB position causing CR301 to switch C308 into the circuit. When C308 is properly adjusted, it shifts the vfo frequency by an amount equal to the frequency separation of crystals Y15 and Y16. This allows either sideband to be selected without retuning or recalibrating the dial. The vfo output voltage is coupled to the cathode of second mixer tube V4A and to the control grid of cathode follower V4B. The cathode follower prevents loading of the vfo circuits by cable capacity when operated in transceiver service.

Tube V11 and associated circuitry comprise a tunable bfo. The bfo tuning control is potentiometer R81. This control varies a positive d-c voltage applied to the junction of voltage-variable capacitor CR4. The junction capacity of this device is proportional to applied voltage. Adjustment of R81 therefore varies the output frequency of the bfo. Voltage for the tuning circuit is stabilized by a regulator consisting of Zener diode CR5 and resistor R82. Switch S13 completes the cathode circuit of either V8B or V11 thus turning on the desired bfo

## SECTION 3

### Principles of Operation

and turning off the other. The output circuits of both oscillators are coupled to the product detector.

#### 3.4 I-F And Detector Circuits.

Output from the second mixer is coupled to either one of two band-pass filters or 455-kc tuned circuits. A mechanical filter with 2.1-kc nominal bandwidth is provided for SSB reception. A band-pass crystal filter with 250 cps nominal bandwidth is selected in the CW position. For AM reception, two cascaded 455-kc transformers provide increased bandwidth. Output from these circuits is coupled through the Q-multiplier to the first i-f amplifier, V6. The cathode of V6 is returned to ground through potentiometer R57 which is used to set the gain of this stage at a point producing the proper agc threshold. The S-meter circuit is connected from the screen circuits of V6 and V7, the two i-f amplifiers, to the cathode of V7. Under no-signal conditions, the voltage developed across R13 is equal to that developed across R17, and the meter reads zero. Application of agc causes the cathode current of V7 and the combined screen current of V6 and V7 to decrease. The voltage across R17 increases, the voltage across R13 decreases, and the meter reads up-scale by an amount which is proportional to signal strength. Output voltage from the second i-f amplifier is coupled to the product detector, V8A. It is also coupled to separate AM and agc diode detectors. Injection voltage is applied to the cathode of the product detector.

#### 3.5 Q-Multiplier And Notch Filter.

The notch filter is composed of coil L8 and associated capacitors and resistors. The rejection notch occurs at the resonant frequency of this circuit and is centered at 455 kc. Capacitor C132 is mechanically coupled to the REJECTION TUNING control which allows the notch frequency to be moved across the receiver i-f passband. Potentiometer R77 is adjusted to provide optimum Q and depth of notch. Switch S10 shorts the filter circuit in the OFF position. The Q-multiplier is a feedback circuit which includes L8. This circuit multiplies the Q of L8 approximately ten times, thereby obtaining a much deeper and narrower rejection notch than would be provided by the filter alone. The notch shape provided by this circuit allows unwanted signals to be rejected with minimum disturbance to desired signals.

#### 3.6 AGC And Control Circuits.

Signal voltage is coupled from the secondary of transformer T6 to one of the diode plates in V9 and rectified. Agc voltage is developed across R24, the diode load resistor, and is applied to the r-f and i-f amplifier stages. Signal voltage is filtered from the agc line by R50 and C49. Generation of agc voltage is delayed until the signal voltage at the diode plate exceeds the cathode bias on V9. Potentiometer R57 in the cathode

of the first i-f amplifier tube is normally adjusted so that agc action is initiated with a receiver input signal of approximately 1.5 microvolts. This point is referred to as agc threshold. Agc time constant is determined by the amount of capacitance placed in parallel with R24. Added capacity in the SLOW position of the AGC selector produces a slower release characteristic.

Manual control of r-f gain is also accomplished through the agc line. A voltage divider circuit, consisting of resistors R33, R55, and RF GAIN control R56, is connected across the negative 65-volt bias line. At the maximum gain setting, this circuit places a one-volt static bias on the agc line to furnish proper operating bias for r-f amplifier V2. At lower control settings, increased bias is provided which reduces the gain. The d-c grid return for the first mixer stage and MUTE jack J11 are connected to the junction of resistors R33 and R58. When the receiver function switch is placed in the STBY position, a ground at J11 causes the receiver to operate in a normal manner. Removal of this ground causes cutoff bias to be applied to the mixer grid and increased bias on the agc line, thus muting the receiver.

#### 3.7 Audio Circuits.

Audio voltage from the appropriate detector is selected by S8A on the EMISSION switch, and is coupled to the AF GAIN control. The CW SIDETONE jack, J10, is also connected to this point. A sidetone audio voltage of approximately 0.2 volt will produce a normal listening level at average gain settings. Audio is amplified in a two-stage amplifier consisting of tubes V8 and V10. Three audio outputs are provided. Jack J8 is a 4-ohm outlet for a speaker. The headphone jack is connected to a resistive divider across the 500-ohm tap on the output transformer. The divider provides a load for V10 when the impedance of headphones used is relatively high. The ANTI-VOX jack, J12, is also connected to the 500-ohm tap. At normal audio gain settings, 5 to 15 volts of audio are available at J12 for use with the anti-vox circuits in an associated transmitter.

#### 3.8 Power Supply Circuits.

The internal power supply furnishes filament, plate, and bias voltages for the receiver. Bias voltage is obtained by rectifying a portion of the a-c voltage appearing from one leg of the high-voltage secondary to ground. The tube filaments and pilot lamps are connected in a way which allows operation from a 6-, 12-, or 24-volt source. Filament, plate, and bias voltages may be furnished by an external source such as a mobile power supply. Figure 7-1 illustrates the proper connections to the power plug for this type of operation.



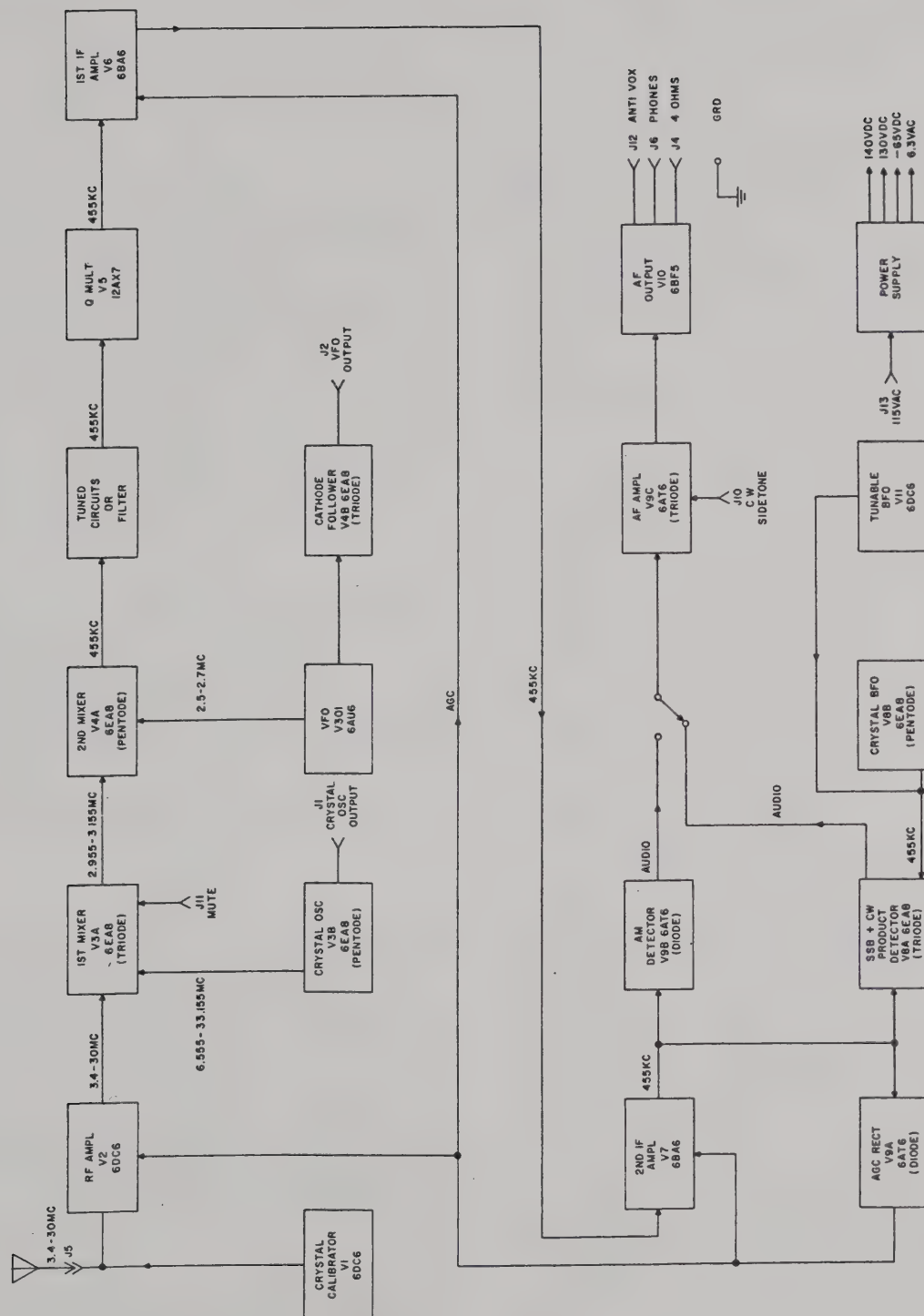


Figure 3-1. Block Diagram





## service instructions

### 4.1 General.

This section covers maintenance and service of 75S-3 and 75S-3A Receivers. It includes information on trouble analysis, signal tracing procedures, voltage and resistance measurements, and alignment procedures. The usefulness of signal level and alignment data given depends upon the accuracy of the test equipment used. Minor adjustments in alignment may be made using the crystal calibrator as a signal source. Except for an occasional touch-up to compensate for possible component aging, alignment normally will be necessary only if frequency-determining components have been replaced. If servicing requires that the cabinet be removed, proceed as follows:

- a. Disconnect all power and external connections.
- b. Lift the lid, and remove the two screws located at the front edge of the cabinet.
- c. Remove the four feet and the screw located midway between the rear feet.
- d. From the rear, push the receiver chassis forward until the front panel protrudes from the cabinet about an inch.
- e. Grasping the front panel at the edges, slide the receiver out of the cabinet.

#### NOTE

DO NOT lubricate the 70K-2 vfo shaft bearings or the dial drive system bearings. The vfo shaft bearings are lubricated at the factory with a special grease. Dial bearings are the Oilite type which are self-lubricating.

Tube filaments and pilot lamps are connected in series-parallel arrangements for 12- or 24-volt operation. When making tube or lamp replacements, be sure that rated filament currents are the same as the original units.

### 4.2 Trouble Analysis.

Most cases of trouble can be traced to defective tubes. Many tube checkers can not duplicate the conditions under which the tubes work in the receiver. Substitution of new tubes will sometimes clear an obscure case of tube trouble. Intermittent trouble conditions in tubes can usually be discovered by lightly tapping the envelope. Occasionally, tube pins or socket terminals will become dirty or

corroded causing an intermittent condition. When this situation is suspected, remove the tube and apply a few drops of contact cleaner to the tube pins. Replace the tube, and work it up and down in the socket a few times. Shorted tubes or capacitors will often cause associated resistors to overheat and crack, blister, or discolor. Making the measurements listed in table 4-1 will help to isolate this type of trouble to a particular stage or component.

A logical process of elimination in conjunction with a study of the main schematic diagram, block diagram, and section 3 will aid in isolating trouble. For example, if the receiver functions properly in the AM position but fails to operate in the SSB or CW positions, trouble in the product detector should be suspected because this circuit is not used for AM reception. As a further check, both beat-frequency oscillators should be alternately switched into the circuit to see if one has failed. A third possibility would be that both beat oscillators have failed.

If the receiver is to be returned to the factory or an authorized service agency, a detailed report of operational difficulties will assist the servicing agency in making repairs with a minimum of time and expense. This is particularly important when intermittent trouble is involved.

### 4.3 Voltage And Resistance Measurements.

Table 4-1 lists typical voltage and resistance readings at each tube socket terminal except those of the vfo tube, V301. Do not open the vfo can. Make all measurements under the following conditions:

- a. Unless otherwise noted in the table, set RF GAIN at maximum, AF GAIN at minimum, EMISSION switch in USB position, function switch in OPR position, tunable bfo off, REJECTION TUNING OFF, and AGC in the FAST position.
- b. Voltage measurements are made with power connected.
- c. Resistance measurements are made with all external cables, including power cable, disconnected. Resistances of less than one ohm are listed as zero.
- d. Make all measurements from indicated socket terminal to chassis ground.

It is recommended that a vtvm be used for these measurements. A vom may be used if it has an input resistance of not less than 20,000 ohms per volt. Voltage measurements made with a vom will yield lower readings in high impedance circuits such as the agc line. Do not use a vom for r-f measurements.

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Service Instructions

TABLE 4-1. VOLTAGE AND RESISTANCE MEASUREMENTS

TUBE	TUBE SOCKET TERMINAL								
	1	2	3	4	5	6	7	8	9
V1 CAL ON DCV CAL OFF DCV ACV OHMS	-52 0 1 MEG	+0.7 52 1000*	0 0	6.3 0	105 142 230K**	51 142 220K**	0 0 0		
V2 DCV ACV OHMS	-0.8 6 MEG	0 0	0 0	6.3 0	138 18K** ①	72 60K**	0 0		
V3 DCV ACV OHMS	112 18K** ①	-11 100K	130 17K** ①	0 0	6.3 0	130 17K** ①	0 0	3.6 1000	0 230K
V4 DCV ACV OHMS	120 18K** ①	0 82	120 18K** ①	6.3 0	0 0	120 19K** ①	4.4 1000	5.4 680	2.7 100K
V5 DCV ACV OHMS	138 18K** ①	-0 100K	1.1 680	0 0	0 0	143 18K** ①	0 340K	1.1 680	6.3 0
V6 DCV ACV OHMS	-0.8 3.7 MEG	0 0	0 0	6.3 0	138 0	74 19K** ①	2.2 22K ①		
V7 DCV ACV OHMS	-0.8 3.6 MEG	0 0	0 0	6.3 0	138 19K** ①	72 23K** ①	0.62 85		
V8 DCV ACV OHMS	46 120K**	-3.2 1 MEG	48 240K**	6.3 0	0 0	112 20K** ①	0 0 ②	0 5	-2.7 5600
V9 DCV ACV OHMS	1.1 680K	2.7 12K	6.3 0	0 0	-0.9 3.5 MEG	0 CW, SB 23 AM ∞ CW, SB 220K AM	100 120K**		
V10 DCV ACV OHMS	-11 250K	0 0	6.3 0	0 0	127 18K** ①	122 18K** ①	-11 250K		
V11 ON DCV OFF DCV ACV OHMS	-2 0 47K	0 25 0 ③	6.3 0	0 0	128 128 20K** ①	30 128 38K**	0 0 0		

\*FUNCTION switch in CAL position

\*\*Resistance may vary depending upon diode and electrolytic condition

① Reverse VOM leads and take highest of the two readings

② Tunable BFO switch OFF

③ Tunable BFO switch ON



TABLE 4-2. SIGNAL LEVELS

SIGNAL INJECTION POINT	GENERATOR OUTPUT FREQUENCY	GENERATOR OUTPUT VOLTAGE	NORMAL INDICATION
V10 - pin 1	1000 cps	5.4 volts	1-watt audio output
V9 - pin 1	1000 cps	0.2 volt	1-watt audio output
V8 - pin 9	455 kc	75 millivolts	1-watt audio output
V8 - pin 6	BFO INJECTION		1.65 volts r-f (each bfo)
V7 - pin 1	455 kc	48 millivolts	Agc threshold
V6 - pin 1	455 kc	175 microvolts	Agc threshold
V4 - pin 6	455 kc	1400 microvolts	Agc threshold
V4 - pin 7	VFO INJECTION		2.0-2.5 r-f volts
V4 - pin 2	3.055 mc	100 microvolts	Agc threshold
V3 - pin 8	HF OSC INJECTION		0.8-2.0 r-f volts
V3 - pin 9	14.1 mc	30 microvolts	Agc threshold
V2 - pin 1	14.1 mc	9 microvolts	Agc threshold
J5 (ANT)	14.1 mc	1.5 microvolts	Agc threshold

#### 4.4 Signal Tracing.

Appropriate test points and normal signal levels are listed in table 4-2. The values listed are nominal. Signal levels in a given receiver may differ from those listed by a factor of plus or minus 20 percent without noticeable degradation in performance. A signal generator with an accurately calibrated output attenuator must be used to provide the r-f signal source voltages indicated. A Hewlett-Packard model 606A or equivalent generator is recommended for this purpose. Be sure to consult the signal generator instruction book for information regarding output termination requirements. Measurements of oscillator injection voltages require the use of an r-f vtm such as the Hewlett-Packard model 410B. Make r-f and audio measurements under the following conditions:

a. For audio measurements, use an audio oscillator as the signal source and an a-c vtm or calibrated oscilloscope to monitor receiver audio output. If desired, an audio wattmeter may be used. Set AF GAIN at maximum, and terminate the 4 $\Omega$  AUDIO output with a four-ohm resistive load.

b. Oscillator injection voltages are measured with an r-f vtm. Measure from cathode to chassis ground at the associated mixer or product detector tube.

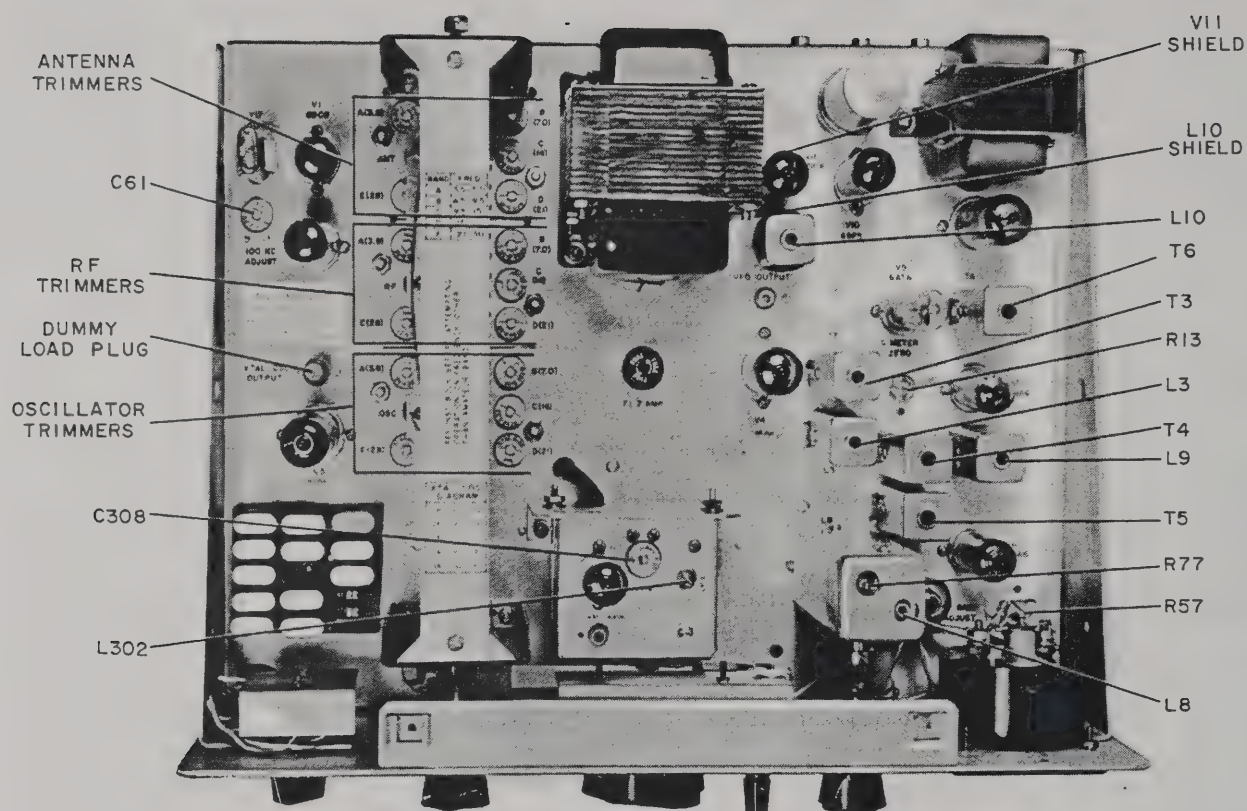
c. To check r-f signal levels, connect a d-c vtm to the receiver agc line. Set RF GAIN at maximum. Static d-c voltage on the agc line should be approximately -1.0 volt. Connect the r-f signal generator to the point indicated in the table, and rock the generator dial to produce maximum agc voltage. Starting from minimum output, increase signal generator output to the point where a further increase in signal produces a slight increase in agc voltage. This is agc threshold. Note generator output voltage, and compare with the value listed in the table.

#### 4.5 Alignment Procedure.

Complete alignment of the receiver may be accomplished using the crystal calibrator as a signal source and the S-meter as a peak indicator. To provide a variable output attenuator for the calibrator, connect a .001-uf capacitor to one end of a 5000-ohm carbon potentiometer. Temporarily connect the free end of the capacitor to tube socket terminal 5 of V1, the crystal calibrator. Connect the rotating contact of the potentiometer to ground. Figure 4-1 shows the location of adjustments except for the filter input and output trimmer capacitors. These trimmers are located under the chassis adjacent to the mechanical and crystal filters. The

## SECTION 4

### Service Instructions



### Figure 4-1. Location of Adjustments

rotary ceramic trimmers used in the receiver are at maximum capacity when the large notch is positioned midway between the two mounting screws. Rotation in either direction from this position reduces capacity with minimum being at 180 degrees from maximum.

#### 4.5.1 455-KILOCYCLE I-F ALIGNMENT.

- a. Set EMISSION switch to USB, and tune to the calibrate signal at 3.7 mc.
- b. Adjust calibrator output attenuator to provide S-meter reading of approximately S-3.
- c. Adjust the slugs of L9 and T6 for peak meter reading. Reduce calibrator output as necessary to maintain a low meter reading. Repeat L9 and T6 adjustments.
- d. Adjust C122 and C123, SSB filter input and output trimmers, for peak meter reading.
- e. Switch to CW position, and adjust C126 and C127, CW filter input and output trimmers, for

peak meter reading. Rock receiver tuning dial to make sure signal is centered in filter passband.

f. Switch to AM position, and adjust top and bottom slugs of T4 and T5 for peak meter reading. This completes alignment.

g. If a signal generator is used for this alignment, remove vfo tube V301, connect generator to pin 2 of V4, and adjust frequency to center of filter pass band. Align as outlined above, disconnect generator, and replace V301.

#### 4.5.2 BAND-PASS I-F ALIGNMENT.

- a. Set EMISSION switch to CW, and tune to the calibrate signal at 3.7 mc.
- b. Make two swamping networks by connecting a .01-uf capacitor in series with a 1000-ohm resistor and connecting alligator clips to the two remaining leads.



c. Connect one swamping network from T3 primary (terminal 1) to ground and the other from L3 (terminal 1) to ground.

d. Adjust attenuator to provide meter reading of approximately S-3.

e. Peak the secondary of T3 (top of can) using a Walsco 2543 or equivalent type tuning tool.

f. Remove both swamping networks and swamp T3 secondary (terminal 3 to ground). Peak T3 primary (bottom of can), and peak L3.

g. Remove swamping network from T3 secondary. This completes band-pass i-f alignment.

h. If a signal generator is used for this alignment, disable the h-f crystal oscillator by removing the crystal for the 3.6-mc band. Connect the signal generator to the XTAL OSC OUTPUT jack, and set to 3.055 mc. Tune receiver to the generator signal at approximately 100 on the dial. Align as above, disconnect generator, and replace crystal.

#### 4.5.3 R-F CIRCUIT ALIGNMENT.

a. Tune to the calibrate signal at 3.7 mc with the EMISSION switch in either USB or LSB position. Connect a 47-ohm resistor or a dummy load such as the DL-1 to the 75S-3/3A ANT jack. During the following procedures, adjust the calibrator output attenuator as necessary to maintain a meter reading of approximately S-3.

b. Set both A (3.8) RF and ANT trimmer capacitors so the large notches point to approximately 2 o'clock when viewed as shown in figure 4-1. Set the A (3.8) OSC trimmer so the large notch points to the rear of the chassis.

c. Set the PRESELECTOR to 2.1 on the logging scale.

d. Adjust the OSC, RF, and ANT slugs located on the movable platform the maximum S-meter indication. Adjust the OSC slug first. After making these adjustments, make sure the PRESELECTOR tuning peaks at 2.1 on the logging scale.

e. Set BAND switch to 28A, PRESELECTOR to 8.9 on the logging scale, and tune to the calibrate signal at 28.6 mc. Maintain S-3 signal level.

f. Adjust E (28) OSC, RF, and ANT trimmer capacitors for peak S-meter reading. Adjust OSC trimmer first.

g. Set BAND switch to 21.0 and PRESELECTOR to 7.9 on the logging scale. Tune to calibrate signal at 21.1 mc. Maintain S-3 signal level.

h. Adjust D (21) OSC, RF, and ANT trimmers for peak S-meter reading. Adjust OSC trimmers first.

i. Set BAND switch to 14.8 and PRESELECTOR to 7.0 on the logging scale. Tune to calibrate signal at 14.9 mc. Maintain S-3 signal level.

j. Adjust C (14) OSC trimmer for peak S-meter reading.

k. Set BAND switch to 14.2 and PRESELECTOR to 6.6 on the logging scale.

l. Adjust C (14) RF and ANT trimmers for peak meter reading. Maintain S-3 signal level.

m. Set BAND switch to 7.0 and PRESELECTOR to 3.9 on the logging scale. Tune to calibrate signal at 7.1 mc. Maintain S-3 signal level.

n. Adjust B OSC, RF, and ANT trimmers for peak S-meter reading. Adjust OSC trimmer first.

o. Disconnect the crystal calibrator output attenuator. This completes r-f alignment.

p. If signal generator and r-f vtm are used for this alignment, connect the generator output to the receiver ANT jack. Set generator output to frequencies listed, and align RF and ANT trimmers as outlined in preceding steps. Connect r-f vtm to XTAL OSC OUTPUT jack on bottom side of chassis, leaving load plug P1 in place. Align OSC trimmers as indicated except adjust for peak reading on the vtm. In step k, adjust PRESELECTOR near 6.6 on logging scale at the point where vtm reading peaks.

#### 4.5.4 VFO SIDEBAND FREQUENCY SHIFT ADJUSTMENT.

Set EMISSION switch to LSB, and tune to zero beat with calibrate signal at 3.7 mc. Without further movement of the dial, switch to USB, and adjust C308 (on vfo) for zero beat.

#### 4.5.5 CRYSTAL CALIBRATOR ADJUSTMENT.

a. Set receiver for AM reception, and tune to WWV at 15.0-mc at a time when the station is not transmitting tone.

b. Turn function switch to CAL position. Set 100 KC ADJUST trimmer C61 for zero beat of the calibrate signal against WWV.

#### 4.5.6 VFO DIAL CALIBRATION.

Calibrate the dial at 100. If zero beat with the calibrate signal does not occur at 0 and 200 +1 kc on the dial, there is end-point spread. If there is no end-point spread, but the hairline is not vertical when the dial is calibrated, a mechanical adjustment only is required. Refer to step h in the following procedure. To correct for end-point spread, make the following adjustments:

a. Set BAND switch to any band and function switch to CAL, and tune calibrate signal to zero beat at 200 end of the dial.

b. Set hairline to 200 with zero set knob.

c. Tune calibrate signal to zero beat at 0 end of the dial. Note the difference in kilocycles between the hairline and dial 0 (example: -1.5 kc).

d. Without moving the hairline, move the dial to the opposite side of 0 by an amount equal to the frequency difference noted above (example: +1.5 kc).

e. Adjust L302 for zero beat. It is located on top of the vfo can.

f. Set the hairline at 0 with zero set knob.

g. Tune the calibrate signal to zero beat at the 200-end of the dial. If zero beat does not occur at exactly 200, repeat steps b through e.



## SECTION 4

### Service Instructions

h. After adjustment of end points, if the hairline is not vertical in the dial window, loosen the set-screws on the dial hub, and move the dial relative to the oscillator shaft so that, at zero beat, the dials reads 0 to 200 with the hairline vertical.

i. After these adjustments of the vfo calibration, make the vfo sideband frequency shift adjustment as outlined in paragraph 4.5.4.

#### 4.5.7 TUNABLE BFO ALIGNMENT.

a. Make sure the BFO tuning knob is correctly positioned on the shaft. At the control end stops, the knob pointer should be at approximately 7 o'clock (ccw end) and 5 o'clock (cw end).

b. Rotate BFO knob to extreme counterclockwise.

c. Turn on calibrator and tune receiver to zero beat in USB position.

d. Turn on tunable bfo, and set BFO knob to 0.

e. Adjust L10 for zero beat.

#### 4.5.8 NOTCH FILTER ALIGNMENT.

a. Check REJECTION TUNING knob position. Pointer should be at OFF when the knob is at the counterclockwise stop. Leave at OFF position.

b. Tune to the calibrate signal on a band which provides a calibrate signal level of approximately S-9 plus

20 db in either USB or LSB position. Center signal in filter passband (approximately 1350-cps tone).

c. Set REJECTION TUNING knob to midscale (pointer vertical).

d. Alternately adjust L8 and R77 for maximum depth of notch as indicated by minimum S-meter reading. If the Q-multiplier exhibits a tendency to ring or oscillate, back off slightly on R77.

#### 4.5.9 I-F GAIN ADJUSTMENT.

To set i-f gain control R57, a signal generator with a calibrated output attenuator is required. Connect the signal generator to the receiver ANT jack, and adjust to 1.5 microvolts output at 28.6 mc. Tune the receiver to the generator signal, and adjust R57 to the point which produces a just-perceptible increase above the no-signal reading on the S-meter. Do not make this adjustment until receiver alignment has been completed.

#### 4.5.10 S-METER ZERO ADJUSTMENT.

a. Set receiver to the middle of any operating band, and peak PRESELECTOR for maximum output.

b. Set RF GAIN to maximum, and short ANT jack to ground.

c. Set S-METER ADJUST (R13) so S-meter reads zero.

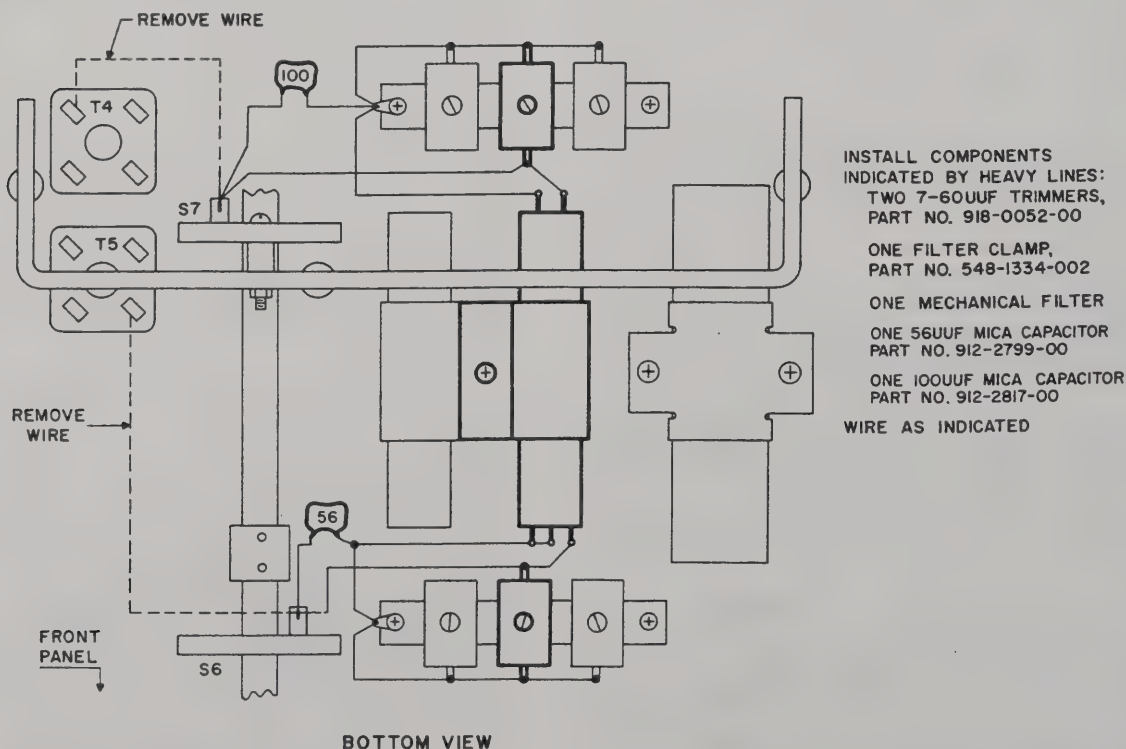


Figure 4-2. Optional Filter Installation Diagram

#### 4.6 Installation of Optional Filters.

Space is provided in the 75S-3/3A to install accessory filters in place of the 455-kc transformers used in the AM function. Figure 4-2 shows the placement of parts and required wiring changes.

To obtain access to the front trimmer-mounting strip, remove the long strip located behind the front panel and fastened by machine screws to the brackets for the front cabinet feet. Bend the mounting tabs on the new trimmer capacitors slightly toward each other, snap the trimmers into place on the trimmer-mounting strips, and solder the appropriate lugs to the ground buses as shown in figure 4-2. Install the filter as shown. If necessary, bend the new filter

clamp slightly to provide a good fit around the filter. One end of the filter has three terminals, one of which has no insulation around it. This is the case ground. Connect this terminal and either one of the two remaining terminals to chassis ground. Either of the terminals on the opposite end of the filter may be used for the ground connection indicated. Dress the new wiring carefully to prevent shorts. Where needed, use spaghetti from removed wiring.

When installation and wiring are completed, turn the receiver on, and tune to the calibrate signal at 14.0 mc. Adjust the filter trimmer capacitors for maximum S-meter reading with the signal centered in the filter passband. Available filters and installation kit of parts are listed in table 5-2.





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section **1**

## installation

**1.1 Unpacking.**

Lift the receiver out of the carton and packing material. Examine for visible damage. If the receiver has been damaged in shipment, save the box and packing material, and notify the transportation company. Complete and mail the equipment registration card. Check tubes and crystals for proper seating in sockets. Check tuning controls and switches for freedom of action. Check that the special Mu-Metal shields are in place on tube V11 and coil L10 (see figure 4-1). Check the equipment included with the receiver against table 1-1.

**1.2 Cabling.**

**1.2.1 EXTERNAL CONNECTIONS.** Figure 1-1 shows the location of jacks for external connections to 75S-3 and 75S-3A receivers. The power cable plugs into socket J13. The ANT jack is a nominal 50-ohm antenna input. The 4  $\Omega$  AUDIO jack is for connection of a speaker.

**CAUTION**

DO NOT connect the a-c power cord to the 115-volt a-c line until power plug P6 has been plugged into J13. To avoid damage to the receiver, make sure the key on P6 is properly aligned with the keyway on J13.

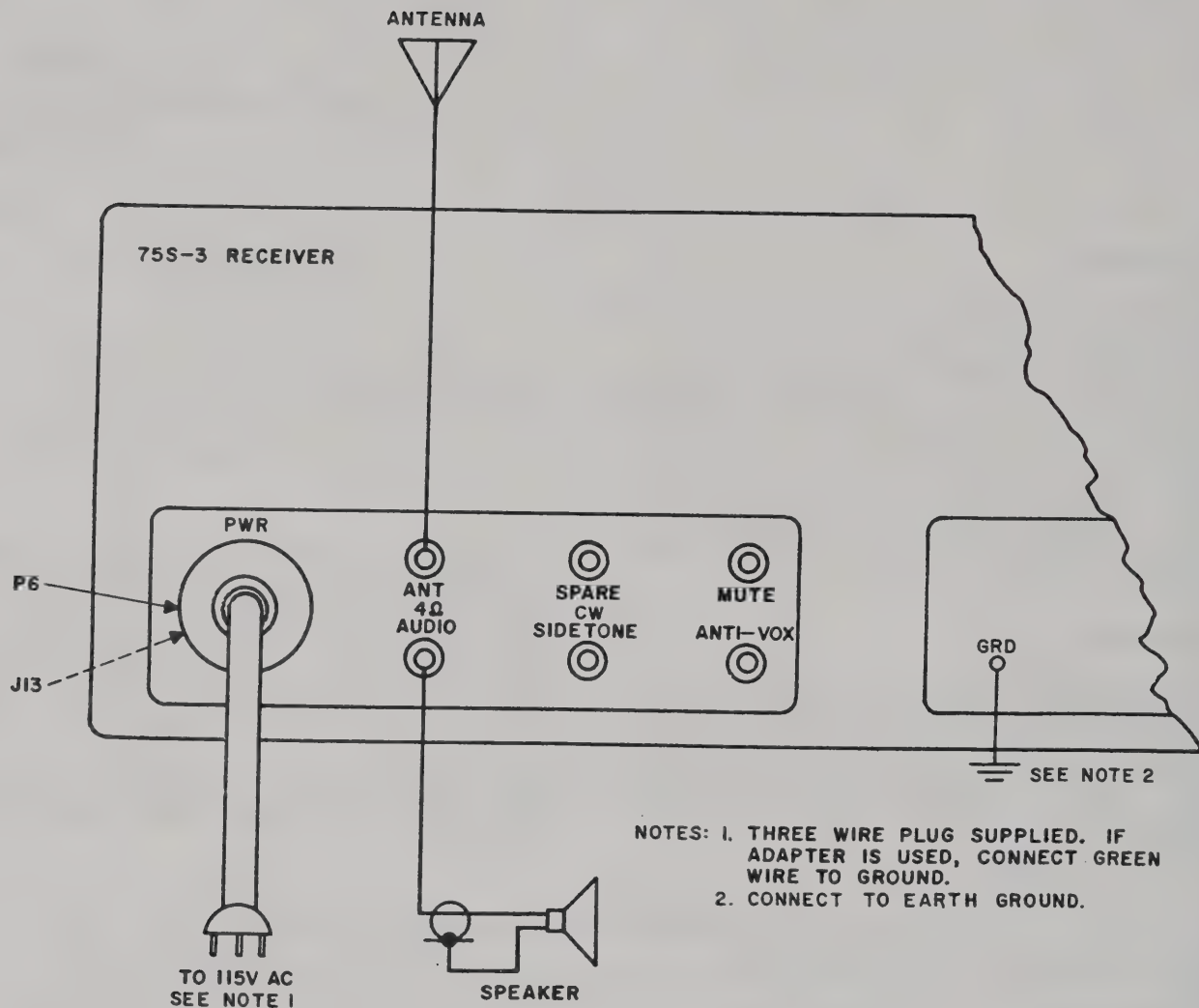
To connect the receiver for mute operation, a means of supplying a ground while receiving must be applied to the MUTE jack. Opening this circuit mutes the receiver. A set of normally closed contacts on a relay which is keyed with the transmitter may be used for this purpose. To use this circuit, the receiver must be operated in the STBY position.

The CW SIDETONE jack is a high-impedance, low-level audio input (0.2 volt rms, typical) to the receiver. Audio from a sidetone oscillator may be applied to this

TABLE 1-1. EQUIPMENT FURNISHED WITH 75S-3/3A

QUANTITY	DESCRIPTION	FUNCTION	PART NUMBER
2	Phono-type connectors	External connections	361-0062-00
1	Fuse, 2-ampere	Spare	264-4070-00
1	Power cord	A-c power	544-3121-00
1	Power plug adapter	A-c power	368-0138-00
1	Instruction book	75S-3/3A instructions	523-0148-00
1	Logbook	Station logging	523-0755-820
1	Cable marker card	Cable identification	280-2946-00
1	No. 4 Bristo wrench	Accessory tool	024-2900-00
1	No. 6 Bristo wrench	Accessory tool	024-9730-00
1	No. 8 Bristo wrench	Accessory tool	024-0019-00
1	No. 10 Bristo wrench	Accessory tool	024-9710-00





NOTES: 1. THREE WIRE PLUG SUPPLIED. IF ADAPTER IS USED, CONNECT GREEN WIRE TO GROUND.  
2. CONNECT TO EARTH GROUND.

Figure 1-1. External Connections

jack to provide a cw monitoring circuit through the receiver audio system.

The ANTI-VOX jack is a 500-ohm audio output from the receiver. At normal speaker volume levels, 5 to 10 volts rms is provided at this output. This voltage is normally applied to anti-vox circuits in an associated transmitter.

The PHONES jack on the front panel is connected through a resistive network to a 500-ohm tap on the output transformer. Therefore, best results will be obtained if headphones used are 500 ohms or higher impedance. The speaker is silenced when headphones are plugged in.

1.2.2 CABLING WITH 32S-3 TRANSMITTER. Figure 1-2 shows a complete station interconnection for a 75S-3 or 75S-3A Receiver, 32S-3 Transmitter, and

312B-4 Station Control. The RG-58C/U cables indicated are slightly larger in diameter and two inches shorter than the audio and control cables. If the 312B-4 is not used, connect a 4-ohm speaker, such as the 312B-3, to 4  $\Omega$  AUDIO jack on receiver. Connect ANTI-VOX jack on receiver directly to ANTI-VOX jack on transmitter. Omit PHONE PATCH and PTT connections.

To connect the 75S-3 or 75S-3A and the 32S-3 for transceiver operation, use the patch cables furnished with the transmitter, and connect as follows:

a. Connect the 32S-3 and 75S-3/3A as shown in figure 1-2.

b. Remove P1 from XMTR XTAL OSC jack J7 (under 32S-3 top cover), and plug it into 32S-3 RCVR XTAL OSC jack J6. Remove the 100-ohm dummy load plug from the 75S XTAL OSC OUTPUT jack, and plug it into 32S-3 XMTR XTAL OSC jack J7.

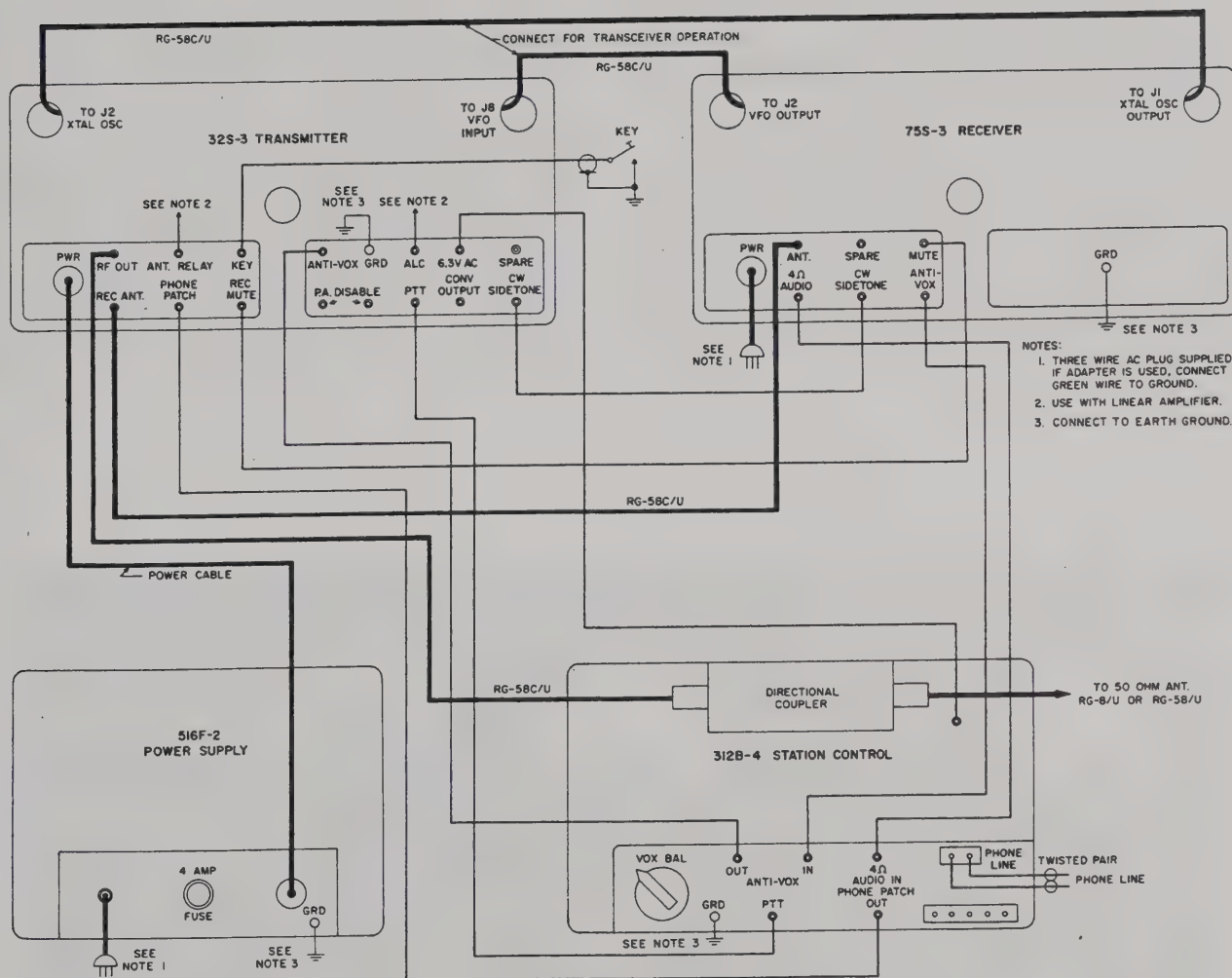


Figure 1-2. Station Interconnections

## SECTION 1

### Installation

**1.2.3 CABLING WITH KWM-2/2A TRANSCEIVER.**  
The 75S-3/3A may be used with a KWM-2/2A to provide separate transmit and receive frequencies. Connect the patch cables as follows:

- a. Using an RG-58C/U patch cable, connect REC ANT jack on KWM-2/2A to ANT jack on 75S-3/3A.
- b. Connect the 500  $\Omega$  jack on the KWM-2/2A to the ANTI-VOX jack on the 75S-3/3A. If a 312B-4 or 312B-5 is used, connect the KWM-2/2A 500 $\Omega$  jack to ANTI-VOX IN and the 75S-3/3A ANTI-VOX jack to ANTI-VOX OUT on the 312B-4/5.
- c. Connect the REC MUTE jack J20 on the KWM-2/2A to the MUTE jack on the 75S-3/3A.

The station speaker may be plugged into either the 4  $\Omega$  jack on the KWM-2/2A or the 4  $\Omega$  AUDIO jack on the 75S-3/3A. For normal mute operation, set the 75S-3/3A function switch to STBY. Receiver output from the KWM-2/2A is turned off by setting AF GAIN to zero. For transmit and receive operation on the same frequency, reduce the 75S-3/3A AF GAIN to zero, and operate the KWM-2/2A in a normal manner.

### 1.2.4 CABLING WITH OTHER TRANSMITTERS.

- a. To provide receiver muting when using 75S-3/3A with KWS-1, connect a cable from pins 5,6 on J102 (receiver disable) in the transmitter to MUTE jack on the receiver. Connect a cable from receiver ANTI-VOX jack to pin 7 on J102 (500-ohm audio) in the KWS-1. Connect cable shield to ground.
- b. To use the 75S-3/3A with the 32V-3, connect a cable from the receiver MUTE jack to receiver disabling pins 24 and 25 on the transmitter.
- c. To use the 75S-3/3A with other makes of transmitters, connect muting, cw sidetone, and anti-vox provisions in the receiver as applicable. The requirements for use are outlined in paragraph 1.2.1.

### 1.3 Initial Checks.

Lift the top cover, and make sure the dummy load (see figure 4-1) is plugged into the XTAL OSC OUTPUT jack unless the receiver is connected for transceiver operation. Recheck the interconnections to make sure the patch cables are plugged into the appropriate jacks. Be sure that RG-58C/U cables, rather than the audio and control cables, have been used for all r-f applications. Check to ensure the special Mu-Metal shields are in place on tube V11 and coil L10.



# section 2

## operation

### 2.1 Calibration.

- After making external connections, set controls as shown in figure 2-1.
- Set BAND switch (11) to desired frequency range. If receiver is 75S-3A, set crystal board selector (10) so desired set of bands appears in window.
- Set dial to 0, 100, or 200 with tuning knob (3).
- Adjust PRESELECTOR (2) for maximum signal or noise output.
- Tune back and forth near 0, 100, or 200 until calibrate signal is at zero beat.
- Adjust zero set knob (4) until dial is calibrated.

### 2.2 Single-Sideband Tuning.

- Set controls as shown in figure 2-1, except set function switch (1) to OPR, and the BFO knob fully counterclockwise until a click is heard.
- Set EMISSION switch (12) to desired sideband.
- Adjust PRESELECTOR (2) for maximum signal or noise output.
- Tune in signal and adjust AF GAIN (9) for desired audio output level.

When listening to strong signals, a reduction in background noise under no-modulation conditions may be

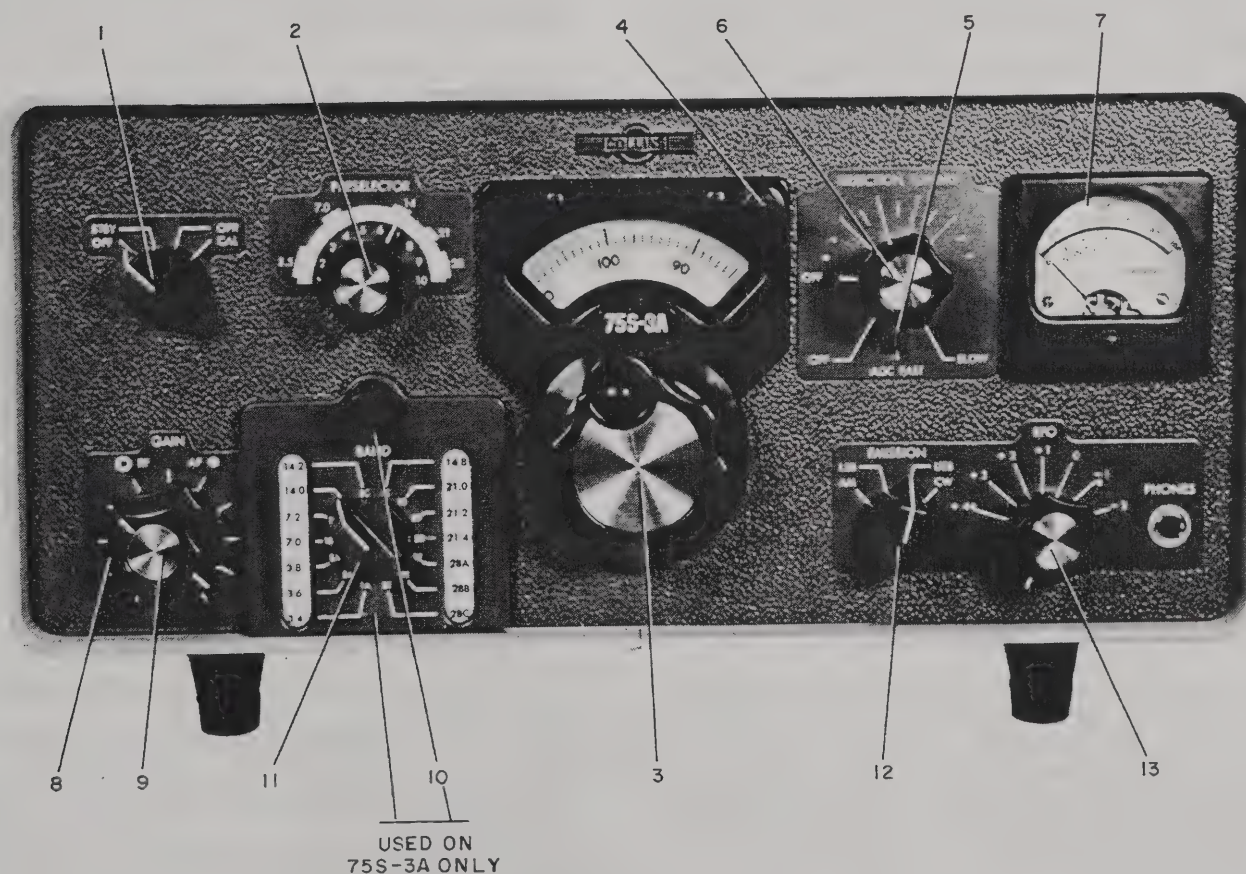


Figure 2-1. Operating Controls

## SECTION 2

### Operation

obtained by rotating RF GAIN control (8) counterclockwise, away from the maximum position. As this is done, S-meter (7) static reading will shift up scale. At proper gain control setting, meter will kick about one or two S-units on peaks. For example, if the weakest of the desired signals is peaking at S-9, set gain control so that static meter reading is S-7 to S-8. This retains accurate meter readings.

To read frequency, add the dial setting to the BAND switch setting. For example, if the BAND switch is set to 3.8 and the dial is set to 5, the frequency is 3.805 mc. If the BAND switch is set to 3.8 and the dial to 170, the frequency is 3.970 mc.

### 2.3 CW Tuning.

a. Set controls as outlined in paragraph 2.2 except set EMISSION switch to CW.

b. Rotate the BFO knob (13) clockwise to energize the tunable bfo. Set to either +1 or -1.

c. Adjust BFO knob to yield the most pleasing beat note with the desired signal centered in the filter pass band.

d. Read approximate frequency as follows: When BFO knob is set to the plus side of zero, add kilocycle reading from bfo scale to dial reading. Subtract bfo reading for minus settings of the knob. If a precision reading is desired, set the BFO knob, and recalibrate the main tuning dial using the crystal calibrator. When the main dial is calibrated in this manner, further adjustment of the BFO knob or switching to the crystal-controlled BFO requires recalibration of the dial.

Either fast or slow AGC (5) may be used, or it may be turned off. If AGC is turned off, decrease RF GAIN control setting to prevent receiver overloading. Adjust AF GAIN control to provide desired audio level. In general, it is best to set r-f gain at a point just below that which causes signal to overload receiver. This provides optimum sensitivity.

Tuning may be facilitated by switching first to USB to tune in the desired signal and then switching to CW to reduce interference. The beat note will be the same in either position. The wider pass band provided in USB is also useful for net operation.

### 2.4 AM Tuning.

a. Set controls as outlined in paragraph 2.2.

b. Set EMISSION switch to AM.

c. Set AGC switch to FAST.

d. Tune in signal, and adjust AF GAIN for desired audio output level.

If desired, SSB methods may be used for AM reception. Set EMISSION switch to either USB or LSB position; use tuning procedure for a single-sideband signal. Once the desired signal is tuned in, switching to the opposite sideband may yield a more readable signal. This method of reception is useful under conditions of severe interference or extreme fading.

### 2.5 RTTY Tuning.

This type of operation requires an external RTTY converter and printer. Tune receiver as follows:

a. Set controls for SSB reception as outlined in paragraph 2.2 with EMISSION switch in USB position.

b. Turn on tunable bfo by rotating BFO knob (13) clockwise.

c. Set the pointer on the BFO tuning knob at the dot near -1 on the calibrated scale.

d. Tune the receiver for maximum S-meter reading on the desired RTTY signal.

e. Fine adjustment of the BFO tuning knob then will produce 2125 cps and 2975 cps mark and space signals at the receiver audio output. To reverse the mark and space signals, reset the BFO tuning knob to the dot near +4 on the calibrated scale.

### 2.6 Rejection Tuning.

An interfering heterodyne or cw signal may be reduced in level or eliminated by operation of the REJECTION TUNING knob (6). The off position for this control is at the end of extreme counterclockwise rotation. The on-off switch is provided with a positive stop rather than a detent. Do not force the knob. Clockwise rotation of the knob from the off position moves the rejection notch across the receiver pass band. It is recommended that the operator familiarize himself with the operation of this control by tuning the notch across the signal from the crystal calibrator.

When the receiver is initially placed in operation, it may be necessary to touch up the adjustment of R77. Refer to paragraph 4.5.8.

### 2.7 Use of S-Meter.

The S-meter is intended primarily to indicate relative rather than absolute signal strength. A nominal meter reading of S-9 is obtained with an input signal of 100 microvolts. The threshold of agc operation is set at the factory to a nominal value of 1.5 microvolts. Due to normal tolerances in receiver operation, agc threshold varies slightly from band to band causing correspondingly slight changes in the number of db represented by each S-unit. The db scale is calibrated with 1 microvolt as a reference; therefore, an S-9 signal of 100 microvolts represents a 40-db increase over the reference signal level. Since agc is not applied to very weak signals, S-zero is arbitrarily established at 10 db on the scale. Typical meter readings, therefore, can represent from 3.3 to slightly over 4 db per S-unit. A figure of 4 db can be taken as an average.

### 2.8 Transceiver Operation with 32S-3 Transmitter.

a. Make sure patch cables are connected as outlined in paragraph 1.2.2.

b. Set FREQ CONTROL (1) on 32S-3 to REC VFO position.

c. Set OFF-STBY-OPR-CAL switch on 75S-3/3A to STBY position.

d. Set both BAND selectors to the same desired band and both EMISSION switches to the same position (either USB, LSB or CW).

e. Tune both receiver and transmitter as in normal operation. Both transmit and receive functions operate from the receiver vfo; the transmitter vfo is not used



in transceiver operation. Switching the transmitter FREQ CONTROL (1) back to TRANS VFO position will allow separate operation of the two units within the same 200-kc band.

## NOTE

In CW transceiver operation, the 75S variable bfo will have to be used to obtain the desired beat note if it is desired to transmit zero beat with another station.

**CAUTION**

When operating in transceiver service, do not operate the transmitter while the receiver is tuned outside band limits; the transmitted signal will be out of the band. Do not attempt operation with receiver and transmitter set on different 200-kc bands, even when operating in TRANS VFO position. With patch cables connected for transceiver operation, the receiver h-f crystal oscillator controls injection frequency to the transmitter second mixer.

If operation on different 200-kc bands is desired (that is, receive on one 200-kc band and transmit on another), remove the transceiver patch cables and operate the units as in normal independent operation.

If transmitted frequency is changed by any great amount, be sure to redip the PA plate current and check the loading. This will be most important on the 80- and 40-meter bands.

Some operating experience will indicate the amount of frequency excursion possible without readjustment.

Do not attempt operation in transceiver service with any other receiver not having the same frequency mixing scheme.

f. To restore both units to normal operation, remove the two patch cables connecting oscillator signals, replace P1 in J7 on the transmitter slug rack (under top cover), and replace the 100-ohm load plug in the receiver XTAL OSC OUTPUT jack.

## 2.9 Operation Outside Amateur Bands.

Additional 10-meter band coverage, or coverage outside the amateur bands may be obtained by plugging an appropriate crystal into the crystal mounting board. Two extra sockets are provided in the mounting board for this purpose. The total 3.4- to 30.0-megacycle coverage available is divided into five segments, designated A, B, C, D, and E. The frequency range of each of these segments is listed in the total coverage column of table 2-1. The letter portions of the crystal socket locations shown in figure 2-2 indicate which sockets may be used for crystals to cover a 200-kc band within a specific total coverage segment. For example, crystals for extended 10-meter coverage must be plugged into sockets marked E.

The proper crystal for coverage of a specific 200-kc band may be selected as follows:

a. If the lower edge of the desired band is 11.8 mc or less, the required crystal frequency is equal to the

TABLE 2-1. CRYSTAL FREQUENCIES AND OPERATING BANDS

BAND-SWITCH POSITION	FREQUENCY BAND	CRYSTAL SUPPLIED	CRYSTAL SOCKET CONNECTED	TOTAL COVERAGE
1A - 3.4	3.4 - 3.6 mc	6.555 mc	1A	A 3.4 - 5.0 mc
2A - 3.6	3.6 - 3.8 mc	6.755 mc	2A	
3A - 3.8	3.8 - 4.0 mc	6.955 mc	3A	
1B - 7.0	7.0 - 7.2 mc	10.155 mc	1B	B 6.5 - 9.5 mc
2B - 7.2	7.2 - 7.4 mc	10.355 mc	2B	
1C - 14.0	14.0 - 14.2 mc	8.5775 mc	1C	C 9.5 - 15.0 mc
2C - 14.2	14.2 - 14.4 mc	8.6775 mc	2C	
3C - 14.8	14.8 - 15.0 mc	8.9775 mc	3C	
1D - 21.0	21.0 - 21.2 mc	12.0775 mc	1D	D 15.0 - 22.0 mc
2D - 21.2	21.2 - 21.4 mc	12.1775 mc	2D	
3D - 21.4	21.4 - 21.6 mc	12.2775 mc	3D	
1E - 28A	28.5 - 28.7 mc	15.8275 mc	2E	E 22.0 - 30.0 mc
2E - 28B	As selected	Not supplied	2E	
3E - 28C	As selected	Not supplied	3E	



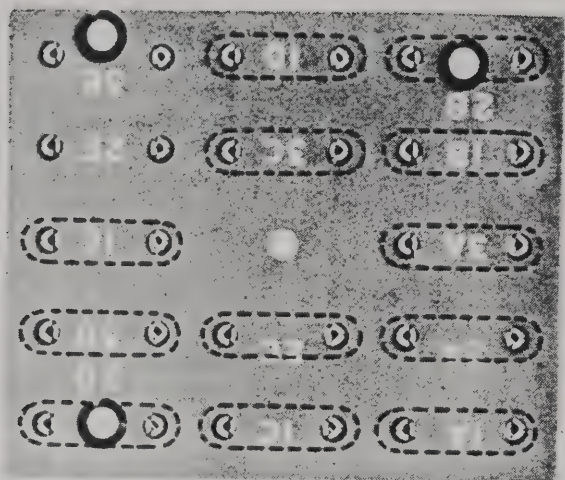


Figure 2-2. Crystal Socket Locations

lower edge of the desired band plus 3.155 mc. For example, if the desired band is 4.0 to 4.2 mc, the required crystal frequency is 7.155 mc.

b. If the lower edge of the desired band is 12.0 mc or higher, the required crystal frequency is equal to half the sum of the desired lower band edge and 3.155 mc. For example, if the desired band is 14.4 or 14.6 mc, the required crystal frequency is 8.7775 mc.

Extra crystals available are listed in section 6, Parts List.

Approximate settings for the PRESELECTION are shown in figure 2-3. For example, if coverage from 10.0 to 10.2 mc is desired, plug the appropriate crystal into a socket marked C, turn the BAND switch to that position, and set the PRESELECTOR to approximately 3.2 on the logging scale. Peak the PRESELECTOR tuning as in normal operation. The ANT, RF, and OSC trimmer capacitors (those marked C in the example above) may also be peaked if optimum performance is desired at frequencies outside the amateur bands. On some bands it is possible to peak the PRESELECTOR tuning at an image frequency or at a different order of output frequency from the crystal oscillator; however, there is only one correct setting for coverage within a given 200-kc band.

The above information also applies to the 75S-3A except that two crystal mounting boards are provided in this receiver. The amateur-band board is located under the chassis. To obtain access, refer to paragraph 4.1. When crystal board selector (10) is switched to extended coverage position, the above-chassis board is switched into the circuit. The crystal socket locations are the same for both boards. Space is provided in the window adjacent to the BAND switch to mark in-band information. A pencil may be used to allow erasure if changes are made.

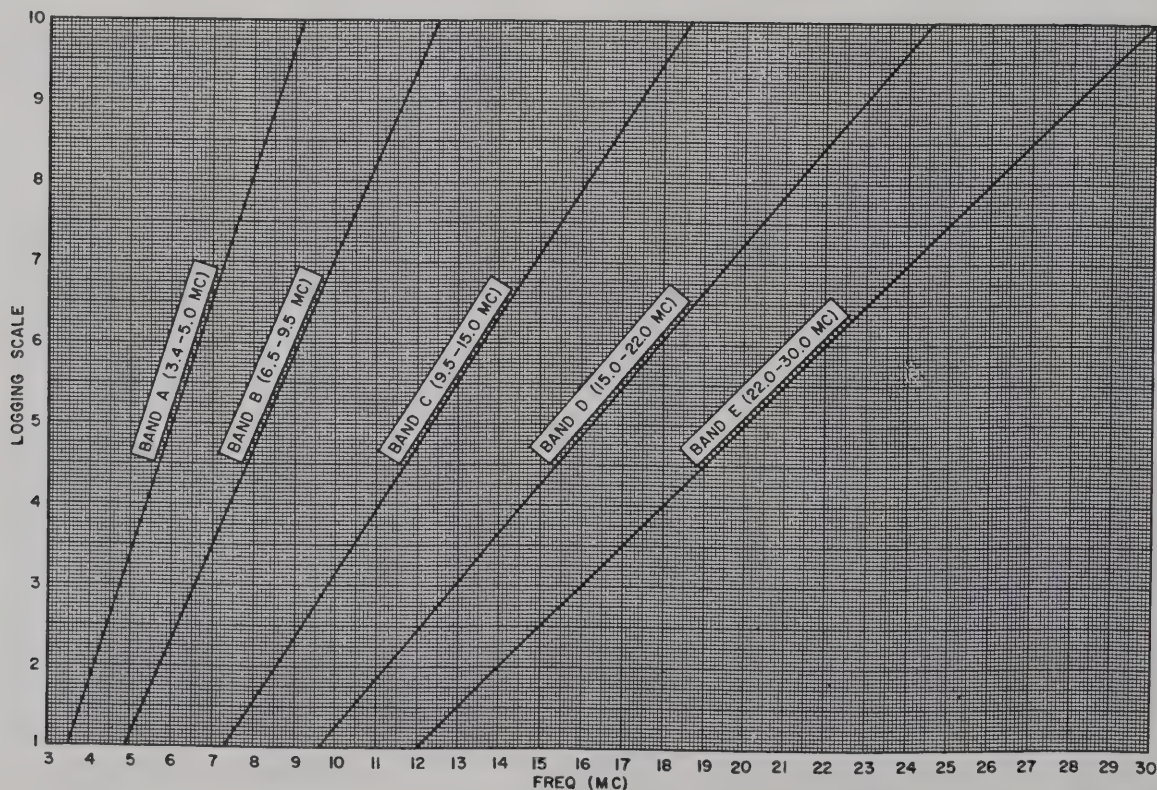


Figure 2-3. Preselector Calibration Curves



## principles of operation

### 3.1 Block Diagram.

Figure 3-1 is a block diagram for 75S-3 and 75S-3A Receivers. Double conversion is used, with injection voltage for the first conversion provided by a crystal-controlled oscillator. A band-pass i-f, 200 kilocycles wide, is used to couple the first and second mixers. Injection voltage for the second mixer is furnished by a vfo with a tuning range of 200 kc. The 455-kc output frequency of the second mixer is coupled through the i-f system to separate AM and SSB detectors. Injection voltage for the product detector is provided by either a crystal-controlled bfo or a tunable bfo. The 75S-3A is identical to the 75S-3 except that it is equipped with an extra h-f crystal mounting board on the chassis, a crystal board selector switch on the front panel, and associated components. Figure 7-1 is a schematic diagram for both receivers, with circuit differences noted.

### 3.2 R-F and Mixer Circuits.

The r-f amplifier grid, high-frequency mixer grid, and crystal oscillator plate circuits are resonated by slug-tuned coils. The slugs are mechanically ganged and linked to the PRESELECTOR tuning knob. The required tuning ranges of these circuits are obtained by switching appropriate values of fixed capacitance in parallel with the coils. The total 3.4- to 30-mc tuning range of the receiver is divided into five segments for band-switching purposes, as noted in table 2-1. The tuned circuit LC ratio is thereby varied within appropriate limits for each of the five segments.

Signals within the particular 200-kc band selected are amplified by V2, the r-f amplifier, and coupled to the control grid of V3A, the first mixer. Injection voltage is coupled to the cathode of V3A. Products of mixing are selected in the plate circuit of V3A, tuned to 3.155 to 2.955 mc which is the band-pass i-f frequency. Signals are coupled to the control grid of second mixer V4A with vfo injection voltage applied to the cathode of this tube.

### 3.3 Oscillator Circuits.

**3.3.1 CRYSTAL OSCILLATORS.** High-frequency crystal oscillator V3B provides injection voltage for the first mixer. The crystal oscillator output frequency is always 3.155 mc higher than the lower edge of the selected band. On bands below 12.0 mc, the oscillator plate circuit is tuned to the crystal frequency. At 12.0 mc and higher, the plate circuit is tuned to the second harmonic. The secondary winding of T2 couples injection voltage to the first mixer cathode circuit and furnishes a d-c return

to ground for mixer tube V3A. Dummy load R41 stimulates the load presented by the 32S-3 Transmitter when connected for transceiver operation.

Crystal-controlled bfo V8B and associated circuitry furnishes injection voltage for the product detector. Crystals Y15 and Y16 provide the proper bfo frequency relationships to the mechanical filter passband to yield optimum audio response from the product detector. Crystal Y15 is used for lower sideband reception, and Y16 is used for upper sideband. Capacitor C95 and coil L-12 form a broadly resonant circuit at 455 kc. Oscillator voltage is developed across R49 and coupled by C100 to the cathode of V8A, the product detector tube.

The crystal calibrator circuit provides marker signals at multiples of 100 kc. Variable capacitor C61 provides for adjustment to zero beat with WWV. The output of this oscillator is coupled to the receiver antenna circuits.

**3.3.2 VARIABLE OSCILLATORS.** The vfo uses fixed capacitance and variable inductance to produce the required tuning range of 2.5 to 2.7 mc. Capacitor C303, in the frequency-determining network, is paralleled by variable capacitor C308 in series with diode CR301. This diode switches C308 in or out of the circuit, depending upon the polarity of a bias voltage impressed across the diode junction. The bias voltage is coupled to the diode through R303, and is positive in the USB position causing CR301 to switch C308 into the circuit. When C308 is properly adjusted, it shifts the vfo frequency by an amount equal to the frequency separation of crystals Y15 and Y16. This allows either sideband to be selected without retuning or recalibrating the dial. The vfo output voltage is coupled to the cathode of second mixer tube V4A and to the control grid of cathode follower V4B. The cathode follower prevents loading of the vfo circuits by cable capacity when operated in transceiver service.

Tube V11 and associated circuitry comprise a tunable bfo. The bfo tuning control is potentiometer R81. This control varies a positive d-c voltage applied to the junction of voltage-variable capacitor CR4. The junction capacity of this device is proportional to applied voltage. Adjustment of R81 therefore varies the output frequency of the bfo. Voltage for the tuning circuit is stabilized by a regulator consisting of Zener diode CR5 and resistor R82. Switch S13 completes the cathode circuit of either V8B or V11 thus turning on the desired bfo

## SECTION 3

### Principles of Operation

and turning off the other. The output circuits of both oscillators are coupled to the product detector.

#### 3.4 I-F And Detector Circuits.

Output from the second mixer is coupled to either one of two band-pass filters or 455-kc tuned circuits. A mechanical filter with 2.1-kc nominal bandwidth is provided for SSB reception. A band-pass crystal filter with 250 cps nominal bandwidth is selected in the CW position. For AM reception, two cascaded 455-kc transformers provide increased bandwidth. Output from these circuits is coupled through the Q-multiplier to the first i-f amplifier, V6. The cathode of V6 is returned to ground through potentiometer R57 which is used to set the gain of this stage at a point producing the proper agc threshold. The S-meter circuit is connected from the screen circuits of V6 and V7, the two i-f amplifiers, to the cathode of V7. Under no-signal conditions, the voltage developed across R13 is equal to that developed across R17, and the meter reads zero. Application of agc causes the cathode current of V7 and the combined screen current of V6 and V7 to decrease. The voltage across R17 increases, the voltage across R13 decreases, and the meter reads up-scale by an amount which is proportional to signal strength. Output voltage from the second i-f amplifier is coupled to the product detector, V8A. It is also coupled to separate AM and agc diode detectors. Injection voltage is applied to the cathode of the product detector.

#### 3.5 Q-Multiplier And Notch Filter.

The notch filter is composed of coil L8 and associated capacitors and resistors. The rejection notch occurs at the resonant frequency of this circuit and is centered at 455 kc. Capacitor C132 is mechanically coupled to the REJECTION TUNING control which allows the notch frequency to be moved across the receiver i-f passband. Potentiometer R77 is adjusted to provide optimum Q and depth of notch. Switch S10 shorts the filter circuit in the OFF position. The Q-multiplier is a feedback circuit which includes L8. This circuit multiplies the Q of L8 approximately ten times, thereby obtaining a much deeper and narrower rejection notch than would be provided by the filter alone. The notch shape provided by this circuit allows unwanted signals to be rejected with minimum disturbance to desired signals.

#### 3.6 AGC And Control Circuits.

Signal voltage is coupled from the secondary of transformer T6 to one of the diode plates in V9 and rectified. Agc voltage is developed across R24, the diode load resistor, and is applied to the r-f and i-f amplifier stages. Signal voltage is filtered from the agc line by R50 and C49. Generation of agc voltage is delayed until the signal voltage at the diode plate exceeds the cathode bias on V9. Potentiometer R57 in the cathode

of the first i-f amplifier tube is normally adjusted so that agc action is initiated with a receiver input signal of approximately 1.5 microvolts. This point is referred to as agc threshold. Agc time constant is determined by the amount of capacitance placed in parallel with R24. Added capacity in the SLOW position of the AGC selector produces a slower release characteristic.

Manual control of r-f gain is also accomplished through the agc line. A voltage divider circuit, consisting of resistors R33, R55, and RF GAIN control R56, is connected across the negative 65-volt bias line. At the maximum gain setting, this circuit places a one-volt static bias on the agc line to furnish proper operating bias for r-f amplifier V2. At lower control settings, increased bias is provided which reduces the gain. The d-c grid return for the first mixer stage and MUTE jack J11 are connected to the junction of resistors R33 and R58. When the receiver function switch is placed in the STBY position, a ground at J11 causes the receiver to operate in a normal manner. Removal of this ground causes cutoff bias to be applied to the mixer grid and increased bias on the agc line, thus muting the receiver.

#### 3.7 Audio Circuits.

Audio voltage from the appropriate detector is selected by S8A on the EMISSION switch, and is coupled to the AF GAIN control. The CW SIDETONE jack, J10, is also connected to this point. A sidetone audio voltage of approximately 0.2 volt will produce a normal listening level at average gain settings. Audio is amplified in a two-stage amplifier consisting of tubes V8 and V10. Three audio outputs are provided. Jack J8 is a 4-ohm outlet for a speaker. The headphone jack is connected to a resistive divider across the 500-ohm tap on the output transformer. The divider provides a load for V10 when the impedance of headphones used is relatively high. The ANTI-VOX jack, J12, is also connected to the 500-ohm tap. At normal audio gain settings, 5 to 15 volts of audio are available at J12 for use with the anti-vox circuits in an associated transmitter.

#### 3.8 Power Supply Circuits.

The internal power supply furnishes filament, plate, and bias voltages for the receiver. Bias voltage is obtained by rectifying a portion of the a-c voltage appearing from one leg of the high-voltage secondary to ground. The tube filaments and pilot lamps are connected in a way which allows operation from a 6-, 12-, or 24-volt source. Filament, plate, and bias voltages may be furnished by an external source such as a mobile power supply. Figure 7-1 illustrates the proper connections to the power plug for this type of operation.



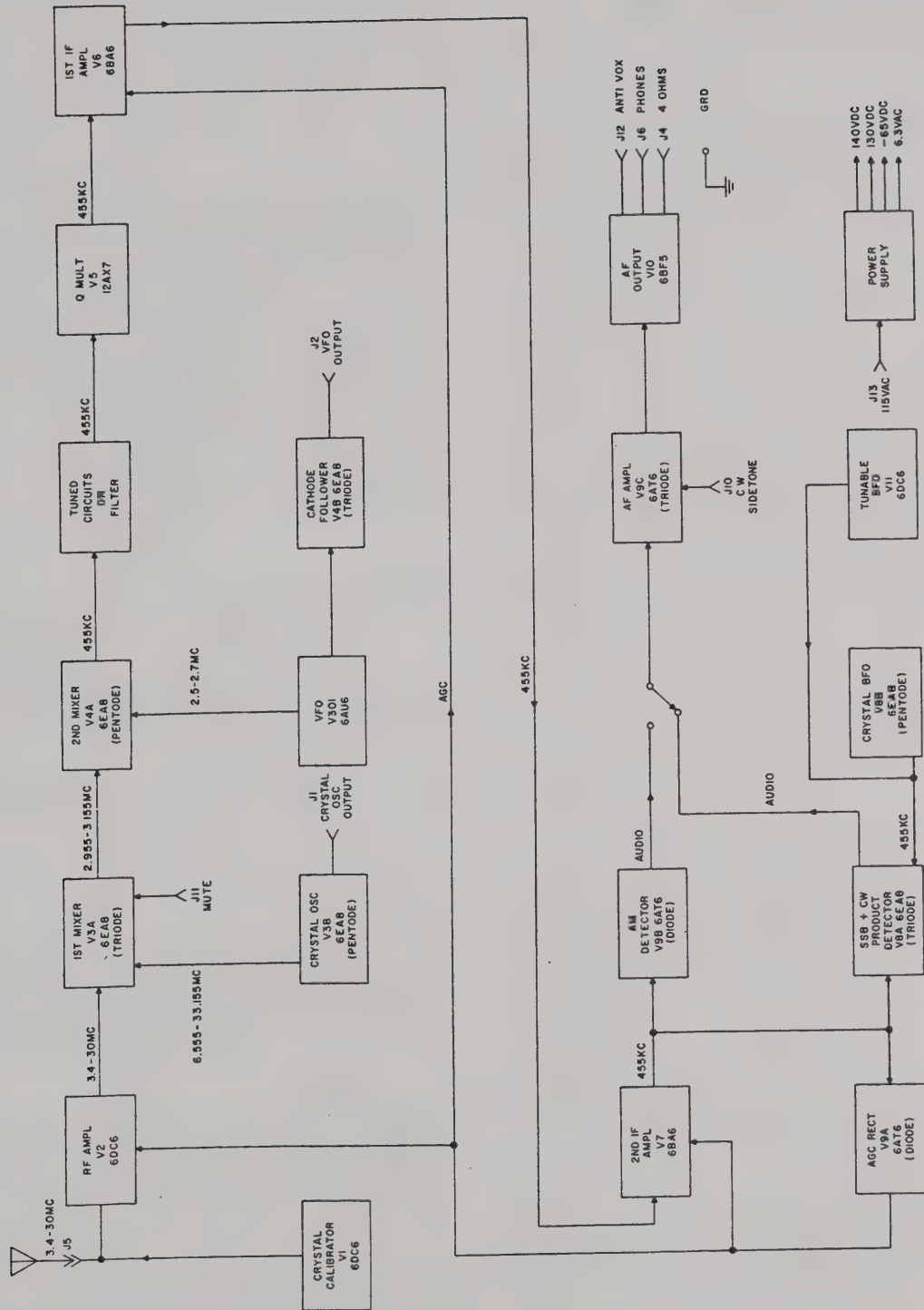


Figure 3-1. Block Diagram



## service instructions

### 4.1 General.

This section covers maintenance and service of 75S-3 and 75S-3A Receivers. It includes information on trouble analysis, signal tracing procedures, voltage and resistance measurements, and alignment procedures. The usefulness of signal level and alignment data given depends upon the accuracy of the test equipment used. Minor adjustments in alignment may be made using the crystal calibrator as a signal source. Except for an occasional touch-up to compensate for possible component aging, alignment normally will be necessary only if frequency-determining components have been replaced. If servicing requires that the cabinet be removed, proceed as follows:

- Disconnect all power and external connections.
- Lift the lid, and remove the two screws located at the front edge of the cabinet.
- Remove the four feet and the screw located midway between the rear feet.
- From the rear, push the receiver chassis forward until the front panel protrudes from the cabinet about an inch.
- Grasping the front panel at the edges, slide the receiver out of the cabinet.

### NOTE

DO NOT lubricate the 70K-2 vfo shaft bearings or the dial drive system bearings. The vfo shaft bearings are lubricated at the factory with a special grease. Dial bearings are the Oilite type which are self-lubricating.

Tube filaments and pilot lamps are connected in series-parallel arrangements for 12- or 24-volt operation. When making tube or lamp replacements, be sure that rated filament currents are the same as the original units.

### 4.2 Trouble Analysis.

Most cases of trouble can be traced to defective tubes. Many tube checkers can not duplicate the conditions under which the tubes work in the receiver. Substitution of new tubes will sometimes clear an obscure case of tube trouble. Intermittent trouble conditions in tubes can usually be discovered by lightly tapping the envelope. Occasionally, tube pins or socket terminals will become dirty or

corroded causing an intermittent condition. When this situation is suspected, remove the tube and apply a few drops of contact cleaner to the tube pins. Replace the tube, and work it up and down in the socket a few times. Shorted tubes or capacitors will often cause associated resistors to overheat and crack, blister, or discolor. Making the measurements listed in table 4-1 will help to isolate this type of trouble to a particular stage or component.

A logical process of elimination in conjunction with a study of the main schematic diagram, block diagram, and section 3 will aid in isolating trouble. For example, if the receiver functions properly in the AM position but fails to operate in the SSB or CW positions, trouble in the product detector should be suspected because this circuit is not used for AM reception. As a further check, both beat-frequency oscillators should be alternately switched into the circuit to see if one has failed. A third possibility would be that both beat oscillators have failed.

If the receiver is to be returned to the factory or an authorized service agency, a detailed report of operational difficulties will assist the servicing agency in making repairs with a minimum of time and expense. This is particularly important when intermittent trouble is involved.

### 4.3 Voltage And Resistance Measurements.

Table 4-1 lists typical voltage and resistance readings at each tube socket terminal except those of the vfo tube, V301. Do not open the vfo can. Make all measurements under the following conditions:

- Unless otherwise noted in the table, set RF GAIN at maximum, AF GAIN at minimum, EMISSION switch in USB position, function switch in OPR position, tunable bfo off, REJECTION TUNING OFF, and AGC in the FAST position.
- Voltage measurements are made with power connected.
- Resistance measurements are made with all external cables, including power cable, disconnected. Resistances of less than one ohm are listed as zero.
- Make all measurements from indicated socket terminal to chassis ground.

It is recommended that a vtvm be used for these measurements. A vom may be used if it has an input resistance of not less than 20,000 ohms per volt. Voltage measurements made with a vom will yield lower readings in high impedance circuits such as the agc line. Do not use a vom for r-f measurements.



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Service Instructions

TABLE 4-1. VOLTAGE AND RESISTANCE MEASUREMENTS

TUBE	TUBE SOCKET TERMINAL								
	1	2	3	4	5	6	7	8	9
V1 CAL ON DCV CAL OFF DCV ACV OHMS	-52 0 1 MEG	+0.7 52 1000*	  0 0	  6.3 0	105 142 230K**	51 142 220K**	0 0 0		
V2 DCV ACV OHMS	-0.8  6 MEG	0  0	  0 0	  6.3 0	138  18K** ①	72  60K**	0  0		
V3 DCV ACV OHMS	112  18K** ①	-11  100K	130  17K** ①	  0 0	  6.3 0	130  17K** ①	0  0	3.6  1000	0  230K
V4 DCV ACV OHMS	120  18K** ①	0  82	120  18K** ①	  6.3 0	  0 0	120  19K** ①	4.4  1000	5.4  680	2.7  100K
V5 DCV ACV OHMS	138  18K** ①	-0  100K	1.1  680	  0 0	  0 0	143  18K** ①	0  340K	1.1  680	  6.3 0
V6 DCV ACV OHMS	-0.8  3.7 MEG	0  0	  0 0	  6.3 0	138  0 0	74  19K** ①	2.2  22K ①		
V7 DCV ACV OHMS	-0.8  3.6 MEG	0  0	  0 0	  6.3 0	138  19K** ①	72  23K** ①	0.62  85		
V8 DCV ACV OHMS	46  120K**	-3.2  1 MEG	48  240K**	  6.3 0	  0 0	112  20K** ①	0  0 ②	0  5	-2.7  5600
V9 DCV ACV OHMS	1.1  680K	2.7  12K	  6.3 0	  0 0	-0.9  3.5 MEG	0 CW, SB 23 AM ∞ CW, SB 220K AM	100  120K**		
V10 DCV ACV OHMS	-11  250K	0  0	  6.3 0	  0 0	127  18K** ①	122  18K** ①	-11  250K		
V11 ON DCV OFF DCV ACV OHMS	-2 0 47K	0 25 0 ③	  6.3 0	  0 0	128 128 20K** ①	30 128 38K**	0 0 0		

\*FUNCTION switch in CAL position

\*\*Resistance may vary depending upon diode and electrolytic condition

① Reverse VOM leads and take highest of the two readings

② Tunable BFO switch OFF

③ Tunable BFO switch ON

TABLE 4-2. SIGNAL LEVELS

SIGNAL INJECTION POINT	GENERATOR OUTPUT FREQUENCY	GENERATOR OUTPUT VOLTAGE	NORMAL INDICATION
V10 - pin 1	1000 cps	5.4 volts	1-watt audio output
V9 - pin 1	1000 cps	0.2 volt	1-watt audio output
V8 - pin 9	455 kc	75 millivolts	1-watt audio output
V8 - pin 6	BFO INJECTION		1.65 volts r-f (each bfo)
V7 - pin 1	455 kc	48 millivolts	Agc threshold
V6 - pin 1	455 kc	175 microvolts	Agc threshold
V4 - pin 6	455 kc	1400 microvolts	Agc threshold
V4 - pin 7	VFO INJECTION		2.0-2.5 r-f volts
V4 - pin 2	3.055 mc	100 microvolts	Agc threshold
V3 - pin 8	HF OSC INJECTION		0.8-2.0 r-f volts
V3 - pin 9	14.1 mc	30 microvolts	Agc threshold
V2 - pin 1	14.1 mc	9 microvolts	Agc threshold
J5 (ANT)	14.1 mc	1.5 microvolts	Agc threshold

#### 4.4 Signal Tracing.

Appropriate test points and normal signal levels are listed in table 4-2. The values listed are nominal. Signal levels in a given receiver may differ from those listed by a factor of plus or minus 20 percent without noticeable degradation in performance. A signal generator with an accurately calibrated output attenuator must be used to provide the r-f signal source voltages indicated. A Hewlett-Packard model 606A or equivalent generator is recommended for this purpose. Be sure to consult the signal generator instruction book for information regarding output termination requirements. Measurements of oscillator injection voltages require the use of an r-f vtvm such as the Hewlett-Packard model 410B. Make r-f and audio measurements under the following conditions:

a. For audio measurements, use an audio oscillator as the signal source and an a-c vtvm or calibrated oscilloscope to monitor receiver audio output. If desired, an audio wattmeter may be used. Set AF GAIN at maximum, and terminate the 4 $\Omega$  AUDIO output with a four-ohm resistive load.

b. Oscillator injection voltages are measured with an r-f vtvm. Measure from cathode to chassis ground at the associated mixer or product detector tube.

c. To check r-f signal levels, connect a d-c vtvm to the receiver agc line. Set RF GAIN at maximum. Static d-c voltage on the agc line should be approximately -1.0 volt. Connect the r-f signal generator to the point indicated in the table, and rock the generator dial to produce maximum agc voltage. Starting from minimum output, increase signal generator output to the point where a further increase in signal produces a slight increase in agc voltage. This is agc threshold. Note generator output voltage, and compare with the value listed in the table.

#### 4.5 Alignment Procedure.

Complete alignment of the receiver may be accomplished using the crystal calibrator as a signal source and the S-meter as a peak indicator. To provide a variable output attenuator for the calibrator, connect a .001-uf capacitor to one end of a 5000-ohm carbon potentiometer. Temporarily connect the free end of the capacitor to tube socket terminal 5 of V1, the crystal calibrator. Connect the rotating contact of the potentiometer to ground. Figure 4-1 shows the location of adjustments except for the filter input and output trimmer capacitors. These trimmers are located under the chassis adjacent to the mechanical and crystal filters. The

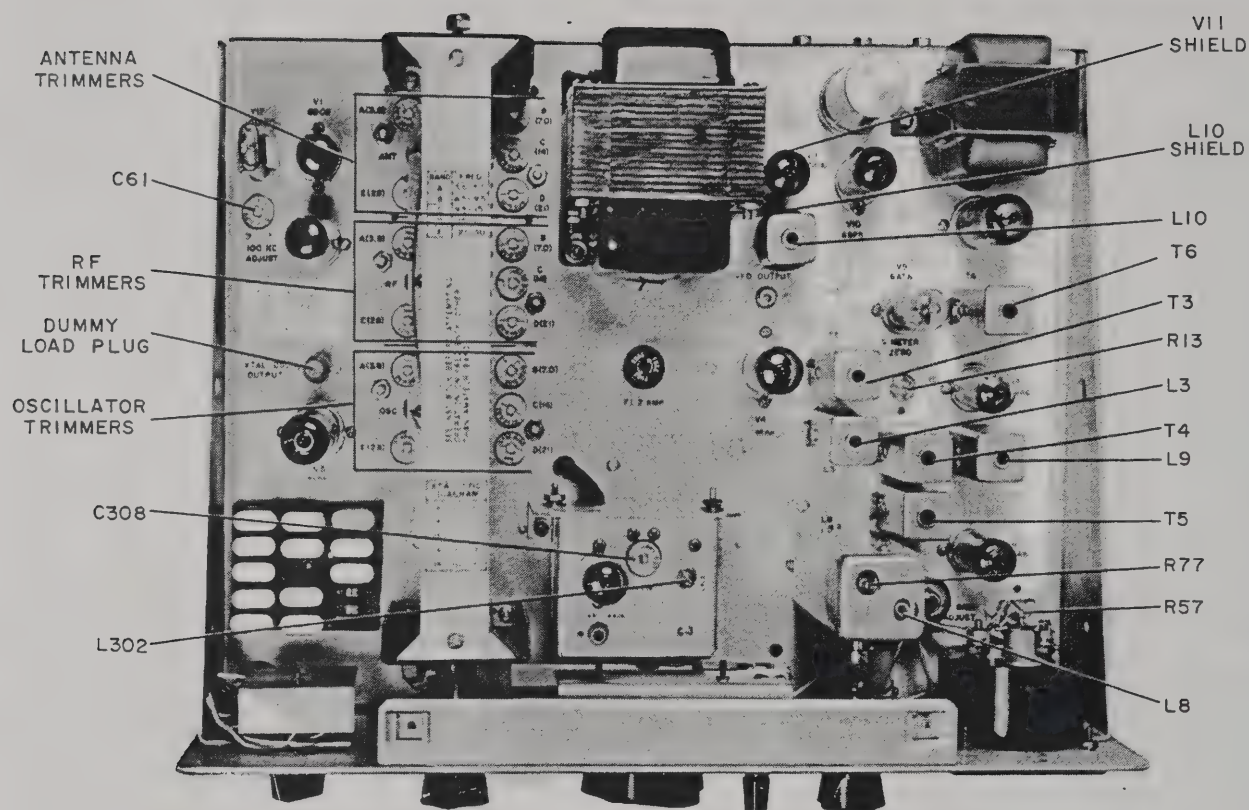


Figure 4-1. Location of Adjustments

rotary ceramic trimmers used in the receiver are at maximum capacity when the large notch is positioned midway between the two mounting screws. Rotation in either direction from this position reduces capacity with minimum being at 180 degrees from maximum.

#### 4.5.1 455-KILOCYCLE I-F ALIGNMENT.

- Set EMISSION switch to USB, and tune to the calibrate signal at 3.7 mc.
- Adjust calibrator output attenuator to provide S-meter reading of approximately S-3.
- Adjust the slugs of L9 and T6 for peak meter reading. Reduce calibrator output as necessary to maintain a low meter reading. Repeat L9 and T6 adjustments.
- Adjust C122 and C123, SSB filter input and output trimmers, for peak meter reading.
- Switch to CW position, and adjust C126 and C127, CW filter input and output trimmers, for

peak meter reading. Rock receiver tuning dial to make sure signal is centered in filter passband.

- Switch to AM position, and adjust top and bottom slugs of T4 and T5 for peak meter reading. This completes alignment.

g. If a signal generator is used for this alignment, remove vfo tube V301, connect generator to pin 2 of V4, and adjust frequency to center of filter pass band. Align as outlined above, disconnect generator, and replace V301.

#### 4.5.2 BAND-PASS I-F ALIGNMENT.

- Set EMISSION switch to CW, and tune to the calibrate signal at 3.7 mc.
- Make two swamping networks by connecting a .01-uf capacitor in series with a 1000-ohm resistor and connecting alligator clips to the two remaining leads.



- c. Connect one swamping network from T3 primary (terminal 1) to ground and the other from L3 (terminal 1) to ground.
- d. Adjust attenuator to provide meter reading of approximately S-3.
- e. Peak the secondary of T3 (top of can) using a Walsco 2543 or equivalent type tuning tool.
- f. Remove both swamping networks and swamp T3 secondary (terminal 3 to ground). Peak T3 primary (bottom of can), and peak L3.
- g. Remove swamping network from T3 secondary. This completes band-pass i-f alignment.
- h. If a signal generator is used for this alignment, disable the h-f crystal oscillator by removing the crystal for the 3.6-mc band. Connect the signal generator to the XTAL OSC OUTPUT jack, and set to 3.055 mc. Tune receiver to the generator signal at approximately 100 on the dial. Align as above, disconnect generator, and replace crystal.

#### 4.5.3 R-F CIRCUIT ALIGNMENT.

- a. Tune to the calibrate signal at 3.7 mc with the EMISSION switch in either USB or LSB position. Connect a 47-ohm resistor or a dummy load such as the DL-1 to the 75S-3/3A ANT jack. During the following procedures, adjust the calibrator output attenuator as necessary to maintain a meter reading of approximately S-3.
- b. Set both A (3.8) RF and ANT trimmer capacitors so the large notches point to approximately 2 o'clock when viewed as shown in figure 4-1. Set the A (3.8) OSC trimmer so the large notch points to the rear of the chassis.
- c. Set the PRESELECTOR to 2.1 on the logging scale.
- d. Adjust the OSC, RF, and ANT slugs located on the movable platform the maximum S-meter indication. Adjust the OSC slug first. After making these adjustments, make sure the PRESELECTOR tuning peaks at 2.1 on the logging scale.
- e. Set BAND switch to 28A, PRESELECTOR to 8.9 on the logging scale, and tune to the calibrate signal at 28.6 mc. Maintain S-3 signal level.
- f. Adjust E (28) OSC, RF, and ANT trimmer capacitors for peak S-meter reading. Adjust OSC trimmer first.
- g. Set BAND switch to 21.0 and PRESELECTOR to 7.9 on the logging scale. Tune to calibrate signal at 21.1 mc. Maintain S-3 signal level.
- h. Adjust D (21) OSC, RF, and ANT trimmers for peak S-meter reading. Adjust OSC trimmers first.
- i. Set BAND switch to 14.8 and PRESELECTOR to 7.0 on the logging scale. Tune to calibrate signal at 14.9 mc. Maintain S-3 signal level.
- j. Adjust C (14) OSC trimmer for peak S-meter reading.
- k. Set BAND switch to 14.2 and PRESELECTOR to 6.6 on the logging scale.
- l. Adjust C (14) RF and ANT trimmers for peak meter reading. Maintain S-3 signal level.

- m. Set BAND switch to 7.0 and PRESELECTOR to 3.9 on the logging scale. Tune to calibrate signal at 7.1 mc. Maintain S-3 signal level.
- n. Adjust B OSC, RF, and ANT trimmers for peak S-meter reading. Adjust OSC trimmer first.
- o. Disconnect the crystal calibrator output attenuator. This completes r-f alignment.
- p. If signal generator and r-f vtm are used for this alignment, connect the generator output to the receiver ANT jack. Set generator output to frequencies listed, and align RF and ANT trimmers as outlined in preceding steps. Connect r-f vtm to XTAL OSC OUTPUT jack on bottom side of chassis, leaving load plug P1 in place. Align OSC trimmers as indicated except adjust for peak reading on the vtm. In step k, adjust PRESELECTOR near 6.6 on logging scale at the point where vtm reading peaks.

#### 4.5.4 VFO SIDEBAND FREQUENCY SHIFT ADJUSTMENT.

Set EMISSION switch to LSB, and tune to zero beat with calibrate signal at 3.7 mc. Without further movement of the dial, switch to USB, and adjust C308 (on vfo) for zero beat.

#### 4.5.5 CRYSTAL CALIBRATOR ADJUSTMENT.

- a. Set receiver for AM reception, and tune to WWV at 15.0-mc at a time when the station is not transmitting tone.
- b. Turn function switch to CAL position. Set 100 KC ADJUST trimmer C61 for zero beat of the calibrate signal against WWV.

#### 4.5.6 VFO DIAL CALIBRATION.

Calibrate the dial at 100. If zero beat with the calibrate signal does not occur at 0 and 200 +1 kc on the dial, there is end-point spread. If there is no end-point spread, but the hairline is not vertical when the dial is calibrated, a mechanical adjustment only is required. Refer to step h in the following procedure. To correct for end-point spread, make the following adjustments:

- a. Set BAND switch to any band and function switch to CAL, and tune calibrate signal to zero beat at 200 end of the dial.
- b. Set hairline to 200 with zero set knob.
- c. Tune calibrate signal to zero beat at 0 end of the dial. Note the difference in kilocycles between the hairline and dial 0 (example: -1.5 kc).
- d. Without moving the hairline, move the dial to the opposite side of 0 by an amount equal to the frequency difference noted above (example: +1.5 kc).
- e. Adjust L302 for zero beat. It is located on top of the vfo can.
- f. Set the hairline at 0 with zero set knob.
- g. Tune the calibrate signal to zero beat at the 200-end of the dial. If zero beat does not occur at exactly 200, repeat steps b through e.

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### Service Instructions

h. After adjustment of end points, if the hairline is not vertical in the dial window, loosen the set-screws on the dial hub, and move the dial relative to the oscillator shaft so that, at zero beat, the dials reads 0 to 200 with the hairline vertical.

i. After these adjustments of the vfo calibration, make the vfo sideband frequency shift adjustment as outlined in paragraph 4.5.4.

#### 4.5.7 TUNABLE BFO ALIGNMENT.

a. Make sure the BFO tuning knob is correctly positioned on the shaft. At the control end stops, the knob pointer should be at approximately 7 o'clock (ccw end) and 5 o'clock (cw end).

b. Rotate BFO knob to extreme counterclockwise.

c. Turn on calibrator and tune receiver to zero beat in USB position.

d. Turn on tunable bfo, and set BFO knob to 0.

e. Adjust L10 for zero beat.

#### 4.5.8 NOTCH FILTER ALIGNMENT.

a. Check REJECTION TUNING knob position. Pointer should be at OFF when the knob is at the counterclockwise stop. Leave at OFF position.

b. Tune to the calibrate signal on a band which provides a calibrate signal level of approximately S-9 plus

20 db in either USB or LSB position. Center signal in filter passband (approximately 1350-cps tone).

c. Set REJECTION TUNING knob to midscale (pointer vertical).

d. Alternately adjust L8 and R77 for maximum depth of notch as indicated by minimum S-meter reading. If the Q-multiplier exhibits a tendency to ring or oscillate, back off slightly on R77.

#### 4.5.9 I-F GAIN ADJUSTMENT.

To set i-f gain control R57, a signal generator with a calibrated output attenuator is required. Connect the signal generator to the receiver ANT jack, and adjust to 1.5 microvolts output at 28.6 mc. Tune the receiver to the generator signal, and adjust R57 to the point which produces a just-perceptible increase above the no-signal reading on the S-meter. Do not make this adjustment until receiver alignment has been completed.

#### 4.5.10 S-METER ZERO ADJUSTMENT.

a. Set receiver to the middle of any operating band, and peak PRESELECTOR for maximum output.

b. Set RF GAIN to maximum, and short ANT jack to ground.

c. Set S-METER ADJUST (R13) so S-meter reads zero.

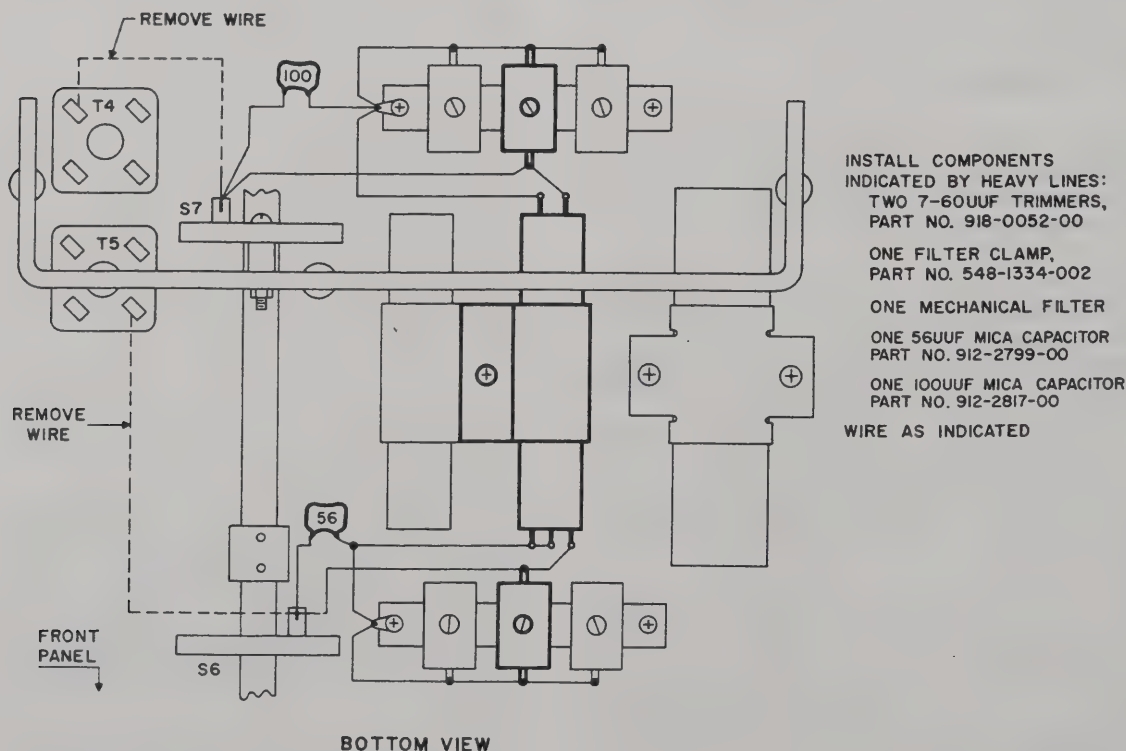


Figure 4-2. Optional Filter Installation Diagram

#### 4.6 Installation of Optional Filters.

Space is provided in the 75S-3/3A to install accessory filters in place of the 455-kc transformers used in the AM function. Figure 4-2 shows the placement of parts and required wiring changes.

To obtain access to the front trimmer-mounting strip, remove the long strip located behind the front panel and fastened by machine screws to the brackets for the front cabinet feet. Bend the mounting tabs on the new trimmer capacitors slightly toward each other, snap the trimmers into place on the trimmer-mounting strips, and solder the appropriate lugs to the ground buses as shown in figure 4-2. Install the filter as shown. If necessary, bend the new filter

clamp slightly to provide a good fit around the filter. One end of the filter has three terminals, one of which has no insulation around it. This is the case ground. Connect this terminal and either one of the two remaining terminals to chassis ground. Either of the terminals on the opposite end of the filter may be used for the ground connection indicated. Dress the new wiring carefully to prevent shorts. Where needed, use spaghetti from removed wiring.

When installation and wiring are completed, turn the receiver on, and tune to the calibrate signal at 14.0 mc. Adjust the filter trimmer capacitors for maximum S-meter reading with the signal centered in the filter passband. Available filters and installation kit of parts are listed in table 5-2.















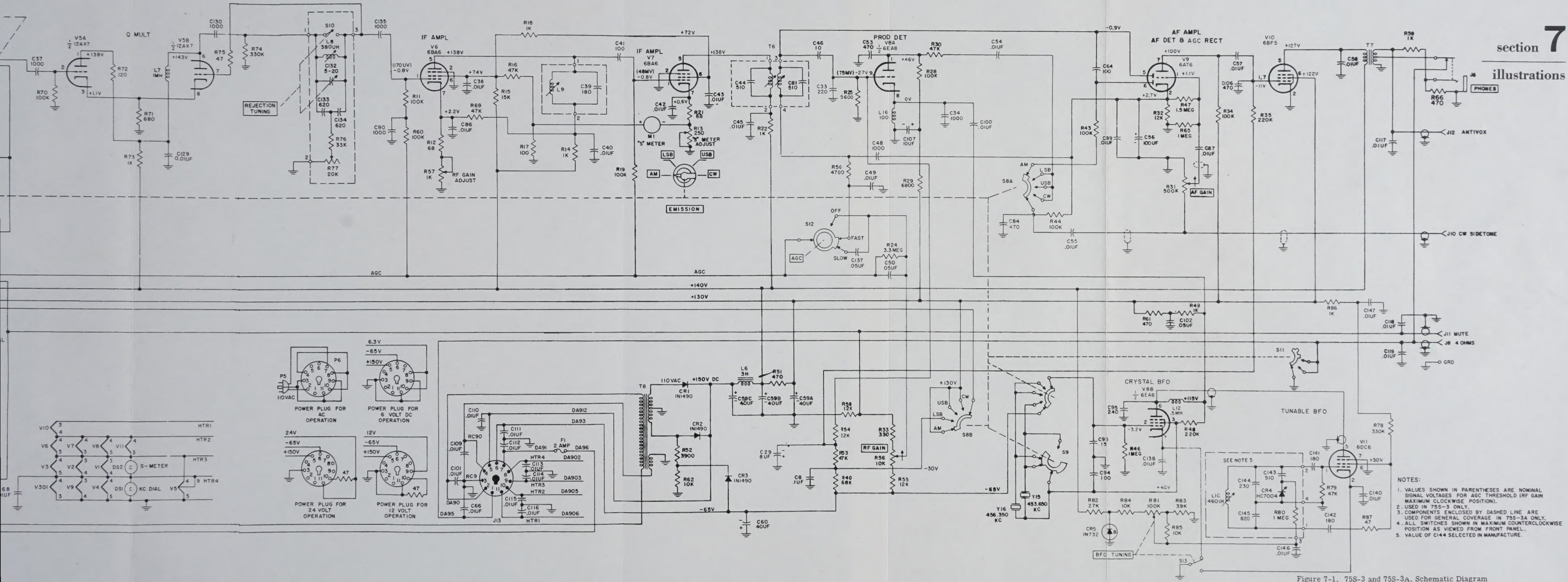


Figure 7-1. 75S-3 and 75S-3A, Schematic Diagram



# section 7

## illustrations

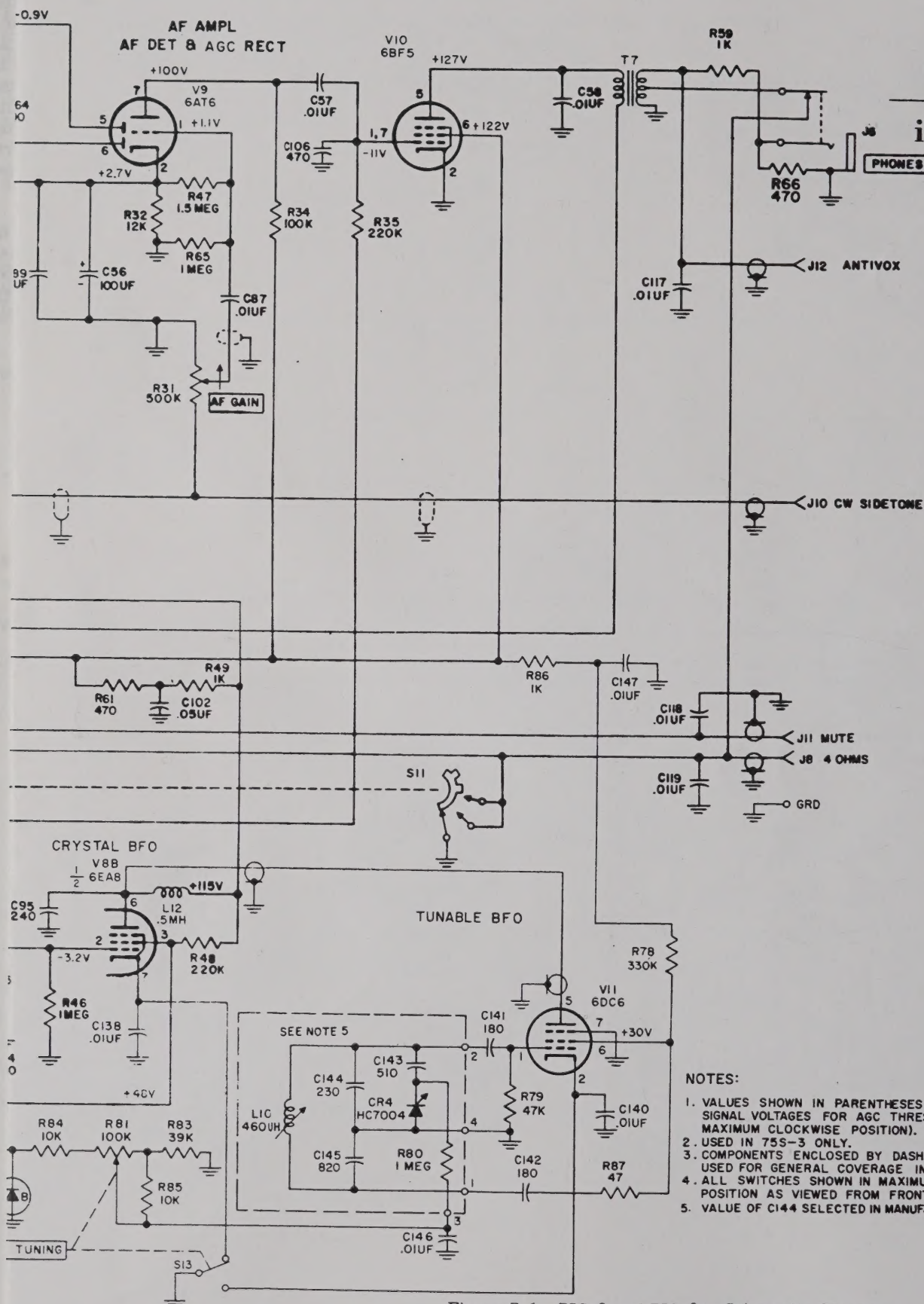


Figure 7-1. 75S-3 and 75S-3A, Schematic Diagram